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MYSTERY ON THE MAINLINE  
WHAT WRECKED THE “CITY OF SAN FRANCISCO?”

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On August 12, 1939, the streamliner *City of San Francisco* violently derailed in the Nevada desert while enroute to San Francisco. The wreck would lead to the deaths of fifteen crewmembers, nine passengers, and injure over one hundred other individuals. At the time it was one of the worst transportation disasters in United States history, and the question which everyone sought to answer was “how did this happen?” From this question, multiple theories would develop to explain the cause of the crash. Yet this incident is more than just an investigation into a crash, for each explanation is rooted in something more.

The year 1939 was another year of hardship for many Americans; just another in a long string of suffering that would become known as the Great Depression. American businesses were just as much victims as the average citizen, and the railroads were no different. It would come as no surprise then that negligence would be the suspicion whispered by all. What were the conditions of the right-of-way? How well was it maintained? Was the operating crew adequately performing their duties?

Simultaneously, a more sinister suspicion began to present itself: sabotage. But why would someone intentionally derail the train, especially in so remote a location? Was the streamliner the target, or was it just the first unlucky train to pass through the area? What technical knowledge would one need to undertake such a dastardly deed?

This paper will attempt to answer each of these questions. This paper will show that the cause of the wreck can clearly be identified as sabotage by carefully examining each alternative theory with all available evidence, and through the use of simple calculations, railroad and public records, photographs taken from the scene, and evidence brought forward in civil trials disprove each alternative theory that points to negligence on the part of the railroad. What will remain is a preponderance of evidence showing this to be nothing less than a premeditated act of mass

murder. The evidence will show that the *City of San Francisco* was the specific target of the saboteur and that given the manner in which the derailment was manufactured, the saboteur must have had a working knowledge of railroads to succeed. The Great Depression is often pictured as Hoovervilles and Okies, of breadlines and no help wanted signs; yet in this unique event one catches a glimpse at what can only be termed a violent act of resistance to the “Octopus of the West.” In the Nevada desert, opulence came to an abrupt and dramatic halt, and those that had, were given a glimpse of what it meant to suffer.

Very little has been published on this incident, and what is published is often little more than a summary of the event. An occasional article in a newspaper recalling an historical event, such as one that appeared in the *Reno Gazette-Journal* in July of 2014.<sup>1</sup> More common place is a small article in a magazine for a railroad enthusiast which generally lays out the events, discussing the derailment and rescue efforts, culminating with the discovery of sabotage. In either case, this is nothing more than event history telling the story of what happened without delving into a further understanding.

What little has been published in academic works tends to focus on witness accounts to provide this in-depth examination. Two articles appearing in the *Northeastern Nevada Historical Society Quarterly* in successive years provide just such an examination. “City of San Francisco Wreck: Eyewitness Account, 1939” is written by survivor F. S. Foote, and is the published account of his memories of the wreck which he wrote done shortly thereafter. The second article, “Recalling a Train Wreck” was composed by Howard Hickson, director of the Northeastern Nevada Museum, who brought together various accounts of the wreck for the archives of his

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<sup>1</sup>Chris H. Sheerin and Paul Leonard. “From 1939: 20 Known Dead in Train Wreck,” *Reno Gazette-Journal*, July 7, 2014, Reno, Nevada.

museum. The article takes excerpts from interviews, oral, and written recollections to provide the reader with a glimpse of the experiences of those who witnessed the events firsthand. These accounts are not just limited to the victims onboard the streamliner, but include the recollections of emergency personnel, members of the press, and townspeople who responded to the scene in an attempt to help.

Not all articles focus entirely on the experiences of those in and around the wreck on the night of August 12<sup>th</sup>, however. Gordon Murphy instead chooses to focus on the thorough investigation conducted by the Southern Pacific Police and the Federal Bureau of Investigation in an event which is “little known by the public, railroad enthusiasts, and forensic scientists.”<sup>2</sup> In his article, Murphy examines the diligent efforts of the investigating authorities and their “painstaking collection, comparison and documentation of physical evidence, trace evidence, and tool marks.”<sup>3</sup> Murphy argues that the systematic investigation and collection of evidence provided a model for which others could follow in similar cases, including those of the modern era faced with an increase of acts of sabotage against transportation networks.

The only large work to be completed regarding the *City of San Francisco* is the book *Tragic Train* by Don DeNevi. For the work, DeNevi was given exclusive access to the Southern Pacific’s collection of evidence and records to, as DeNevi’s acknowledgement states, tell the story in its entirety.<sup>4</sup> DeNevi divides the book into two sections: the first covers the train’s journey west and subsequent derailment in the Nevada desert, the second covers the investigation of the Southern Pacific’s special agents, their collection of evidence, and attempt to find those

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<sup>2</sup> Gordon K. Murphy, “Death in the Desert: The Sabotage-derailment of ‘The City of San Francisco,’” *The Journal of Forensic Medicine* 4, no. 2 (June 1983): 145.

<sup>3</sup> *Ibid.*, 146.

<sup>4</sup> Don DeNevi, *Tragic Train “The City of San Francisco:” The Development and Historic Wreck of a Streamliner* (Vancouver: Evergreen Press, 1997).

responsible. Sadly, DeNevi's unique access to records pertinent to this event are squandered as the book is riddled with factual errors. Told in the narrative, the book presents the story of the wreck through the eyes of individuals involved. In so doing, elements of fact are often discarded or skewed in order to improve the dramatic elements of the storyline. Furthermore, despite DeNevi holding an advanced degree in history and his status as a college professor, the book contains no citations, no bibliography, no way to determine where DeNevi is obtaining his facts.

The absence of published material available regarding this incident therefore makes this paper even more relevant. This paper will help to provide a complete examination of the event in its entirety and help to understand why some still question the cause to this day.

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The *City of San Francisco* was one of the premier passenger railroad trains of its time. One of the first streamlined trains to be placed into operation, the *City of San Francisco* consisted of three power units and fourteen articulated passenger cars that stretched out one thousand two hundred ninety-two feet, or just short of a quarter mile in length.<sup>5</sup>

Despite its length, the train was designed for speed. At a time when nearly all the leading passenger rail service operations were still pulled behind steam locomotives, the *City of San Francisco* was powered by six state-of-the-art twelve cylinder diesel engines. With two engines per power unit, the *City of San Francisco* boasted an output of five thousand four hundred horsepower,<sup>6</sup> which allowed the train to travel up to speeds of ninety-five miles per hour in some

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<sup>5</sup> DeNevi., 9.

<sup>6</sup> Chicago and Northwestern Lines, Union Pacific Railroad, and Southern Pacific Lines, *The Streamliner City of San Francisco*. Promotional Pamphlet. Circa 1939. Southern Pacific Transportation—City of San Francisco Wreck 1939 Collection, MS NC 505. Nevada Historical Society, Reno, Nevada.

areas.<sup>7</sup> The train owed its speed not only from the power in the front, but also to the revolutionary design of the cars that the power units pulled.

The trainset for the *City of San Francisco* was built by the Pullman-Standard Car Manufacturing Company using the most modern engineering techniques. Rather than use a heavy, all steel construction, Pullman created a lightweight design for the new streamliner which utilized steel alloys for the frame, and aluminum for the body. The difference was evident: the standard “heavyweight” steel passenger cars used throughout most of the United States at the time averaged eighty to ninety tons,<sup>8</sup> but the lightweight cars in the *City of San Francisco* consist averaged sixty to seventy tons.<sup>9</sup> As a whole, this meant the train was roughly ten percent lighter than a standard consist. The train also incorporated the use of articulated cars, whereby several cars were semi-permanently attached to one another sharing common axles. With fewer axles, more weight could be shed, and the passengers onboard could enjoy a smoother ride due to less vibration. The articulated cars also allowed for more interior space and ease of movement throughout the train, whilst simultaneously creating a smooth, sleek appearance on the outside that improved aerodynamics during operation.

The *City of San Francisco* was jointly operated by the Chicago and North Western, Union Pacific, and Southern Pacific Railroads and made five round-trip runs between Chicago and San Francisco each month. The train followed the Overland Route –the original transcontinental route– which ran via Omaha, Nebraska, Ogden, Utah, Reno, Nevada, and

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<sup>7</sup> H. E. Watts, and J. K. Parkinson, *Southern Pacific Company Board of Inquiry Report*. August 19-21, 1939. City of San Francisco Derailment Collection, MS-39, California State Railroad Museum Library, Sacramento, California: 115.

<sup>8</sup> Pullman Car Records, Pullman Digital Collection, Newberry Library, Chicago, Illinois.

<sup>9</sup> *Board of Inquiry Report*, 233.

Sacramento, California between its two termini.<sup>10</sup> The powerful motive power combined with lightweight aerodynamic consist provided a speed of travel that was unparalleled.

Advertisements for the *City of San Francisco* boasted an astonishing travel time of thirty-nine and three-quarter hours between Chicago and San Francisco.<sup>11</sup> By comparison, the next fastest train on the same route was the *Challenger* which traversed the route in seventy-two and three-quarter hours.<sup>12</sup>

Not only was it fast, but the *City of San Francisco* was also luxurious. In addition to the coaches, the train also contained sleeper cars, a diner, tavern-coffee shop, and an observation lounge. Sleeper cars varied in design from plain open-section sleepers, to bedroom cars with bunk beds, and the roomette car “a modern type of individual bedroom.” The roomette contained “a folding bed, converted into a spacious lounge seat when not in use” with “ample space for lounging, or undressing, before the bed is lowered.”<sup>13</sup> Each car aboard the streamliner was air conditioned, and restrooms, bedrooms, and roomettes were “equipped with special outlets for electrical razors and curling.”<sup>14</sup> Aerial antennas which ran along the top of the train allowed passengers to listen in to their favorite radio programs as they breezed through the countryside, and portable radios were made available free of charge. If all this were not enough, the train included hot and cold running water showers, a full-service barber shop, and a first on American railroads, an on-board registered nurse.<sup>15</sup>

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<sup>10</sup> Southern Pacific Company, *Time Tables for Train Distribution: Overland Route*. August 1939. City of San Francisco Train Wreck Collection, Northeastern Nevada Museum, Elko, Nevada.

<sup>11</sup> Southern Pacific Company, “The New Streamliner ‘City of San Francisco’” (advertisement), circa 1938. <http://streamlinermemories.info/UP/COSF3rdgenposter.jpg>.

<sup>12</sup> Southern Pacific Company, *Time Tables for Train Distribution: Overland Route*. August 1939.

<sup>13</sup> Chicago and Northwestern Lines, Union Pacific Railroad, and Southern Pacific Lines, *The Streamliner City of San Francisco*. Promotional Pamphlet. Circa 1939.

<sup>14</sup> Ibid.

<sup>15</sup> Ibid.

Such diverse amenities meant that tickets did not come cheap. The cheapest ticket, a coach seat, cost ninety dollars round-trip. In addition, because of the preeminent status of the streamliner, there was also a five dollar extra fare added to the ticket price bringing the round-trip total to ninety-five dollars. This is roughly the equivalent of one thousand six hundred and twenty dollars in 2015.<sup>16</sup> If this seems expensive, keep in mind that 1939 America was still in the grip of the Great Depression, and the average monthly income was just one hundred fourteen dollars.<sup>17</sup>

For many individuals, like Thomas Hood of Elko, Nevada, the streamliner invoked feelings of wonder and admiration as he watched it pass through town. Thomas remembered the train “never stopped in Elko, just went through town at forty miles an hour; bright yellow and all those people riding in luxury and looking out at us and we looking in at them, thinking that sometime we might be lucky enough to ride that train. I’m sure that there weren’t five people in Elko who had been on that streamliner. You had to pay an extra fare.”<sup>18</sup>

For others like F.S. Foote, a Berkley native who was now working for IBM in New York, the streamliner was a way to maximize his time back home.<sup>19</sup> “I planned to be in Berkley for eleven days. The only means for me to accomplish even that much time was... to leave New York on Thursday evening August 10, making it possible for me to make connections with the ‘City of S[an] F[rancisco]’ which left Chicago on Friday August, 11.”<sup>20</sup> What Foote did not

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<sup>16</sup> United States Department of Labor, Bureau of Labor Statistics. *CPI Inflation Calculator*. [http://www.bls.gov/data/inflation\\_calculator.htm](http://www.bls.gov/data/inflation_calculator.htm).

<sup>17</sup> Dianne Petro, “Brother Can You Spare a Dime? The 1940 Census: Employment and Income,” *Prologue Magazine* 44, no. 1 (Spring 2012), digital.

<sup>18</sup> Howard Hickson, “Recalling a Train Wreck: City of San Francisco Streamliner- 1939,” *Northeastern Nevada Historical Society Quarterly* 80, no. 1 (Winter 1980): 3.

<sup>19</sup> F.S. Foote, “City of San Francisco Wreck: Eyewitness Account, 1939 Near Harney,” *Northeastern Nevada Historical Society Quarterly* 90, no. 1 (1989): 15.

<sup>20</sup> F. S. Foote. “Detailed Account of my Recollection of City of San Francisco Accident,” September 13, 1939. City of San Francisco Train Wreck Collection, Northeastern Nevada Museum, Elko, Nevada.

know when he purchased his coach ticket in July was that in only one month's time he would find himself in the midst of one of the most contentious transportation disasters of the century and barely escape with his life.

On August 12, all was normal on the trip west except for a slight delay incurred just east of Ogden, Utah. Foote recalled that the streamliner had been delayed by an hour because of a minor collision between a freight train and switch engine that had blocked the tracks.<sup>21</sup> When the operating crew took over in Carlin, Nevada for the trip over their section into Reno, each crew member noted that the train departed twenty-nine minutes late at 9:15pm.<sup>22</sup>

At approximately 9:33pm the *City of San Francisco* rounded a curve leading to bridge number five crossing the Humboldt River. Engineer Ed Hecox noticed a green tumble weed on the track ahead, remembering it as odd to see a green tumble weed in August. As the train reached the point on the track where the tumbleweed lay, Hecox states rather modestly, "I struck it and felt myself derail. We ran across the bridge and came to a stop."<sup>23</sup>

For the passengers riding the cars behind, the experience was much more harrowing than the account provided from Engineer Hecox at the head-end of the train. Foote, who was just leaving the coffee shop to return to his seat in coach recalled, "The car jumped the tracks, lights went out, and I had the feeling of being a die in a dice box. Breaking glass, grinding metal, then a moment of things happening too fast for comprehending or remembering."<sup>24</sup> Other passengers shared similar memories. "The first thing we noticed was the car changing from smooth, easy riding, to roughness," recalled William Ruocco, Jr., "the lights went out and we turned over

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<sup>21</sup> Foote, "Detailed Account of my Recollection of City of San Francisco Accident."

<sup>22</sup> See *Board of Inquiry Report*. Engineer Hecox, 1; Fireman Kelly, 29; Head-end Brakeman Thomas, 102; Rear-end Brakeman Webster, 116.

<sup>23</sup> *Board of Inquiry Report*, 2.

<sup>24</sup> Foote, "Detailed Account of my Recollection of City of San Francisco Accident."

twice and then the car rested at an angle.”<sup>25</sup> A steward in the club car *Embarcadero* stated, “Suddenly I felt a jar. A moment later, the lights went out, and so did I.”<sup>26</sup> V. V. Welch, also in the *Embarcadero*, recalled “when the lights died we turned end over teakettle. I regained consciousness to find the car telescoped back to the place we had been sitting and playing cards.”<sup>27</sup>

Much of the tragedy had been compounded by the bridge over the Humboldt River. As the train derailed, it continued to travel down the tracks. The locomotive, two additional power units, the baggage car, and chair car *Market Street* continued across the bridge coming to stop approximately 907 feet later. The front left corner of the *Market Street* car had struck the steel girders of the bridge as it traveled across, scraping along the left side of the car as it traveled across. Following behind *Market Street* were the articulated diner-kitchen cars *Presidio* and *Mission Dolores*. The *Presidio* also struck the bridge truss, but this time did so with such force that the impact caused the west bridge abutment to move 1 ½ inches of out alignment. Additionally, the impact caused the *Presidio* to uncouple from *Market Street* and the strain on the bridge was so great that it began to collapse. The *Presidio* fell to the river bottom below with the bridge landing on top of it. *Mission Dolores* would follow *Presidio* into the riverbed, crashing into the debris of the car and wreckage of the bridge. Of the twenty-four individuals killed in the wreck, all but three were aboard these two cars;<sup>28</sup> fifteen of those victims were the cooks and wait staff.<sup>29</sup>

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<sup>25</sup> Hickson, 7.

<sup>26</sup> Ibid., 8-9.

<sup>27</sup> Ibid., 9.

<sup>28</sup> United States Interstate Commerce Commission. *Report of the Director Bureau of Safety: Accident on the Southern Pacific Railroad, Harney, Nevada, August 12, 1939, Investigation no. 2375*. United States Government Printing Office: Washington, D.C., 1939, 7.

<sup>29</sup> *Board of Inquiry Report*, List of Fatalities, 1-2.

*Embarcadero* and the articulated sleepers *Twin Peaks* and *China Town* followed into the riverbed becoming entangled with the bridge structure. *Twin Peaks* and *China Town* became separated at the point of articulation. *China Town* fell between a gap in the debris from the wrecked bridge landing on, and crushing the roof structure of the *Twin Peaks* resulting in three additional fatalities. *China Town* would come to rest at an angle on top of the collapsed bridge (pictured Figure 1)<sup>30</sup>. Two additional cars would continue down the embankment into the riverbed, but did not suffer the extensive damage of those cars that became intertwined with the wreckage debris. Another two cars would derail without falling into the riverbed, and the final three came to a stop before becoming derailed.<sup>31</sup>

“As the engine stopped, I ran back,” explained Hecox, “All I could hear was the screams and moans of the injured and dying... I could not see a single living person.”<sup>32</sup> After passing directions to Fireman Kelly, Hecox began running the one and a half miles up track to the section house in Beowawe to summon aid.<sup>33</sup>

Within hours, help began to arrive from Beowawe, Carlin, and Elko, and what they found was a scene of horror. “We got to the wreck and it was a horrible scene!” recalled Warren Monroe who had come to the scene as the editor for the *Elko Independent*. “There were parts of human bodies scattered around; there were injured people moaning and groaning, waiting for help.”<sup>34</sup> Flora Collins recalled walking along the side of a hill to get to survivors and observing a severed leg laying alone, its host nowhere to be found.<sup>35</sup> Les Moren, a physician from Elko,

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<sup>30</sup> Earl Frantzen, “Southern Pacific Railroad (Streamliner) Wreck Near Carlin, 1939.” Southern Pacific Transportation—City of San Francisco Wreck 1939 Collection, MS NC 505, photograph no. 277. Nevada Historical Society, Reno, Nevada.

<sup>31</sup> Interstate Commerce Commission, 9-10.

<sup>32</sup> Hickson, 5.

<sup>33</sup> *Board of Inquiry Report*, 1-3.

<sup>34</sup> Hickson, 9.

<sup>35</sup> Flora Collins interviewed by Howard Hickson

remembered seeing “dead bodies scattered around like cordwood.”<sup>36</sup> Moren would also recall how victims, once evacuated to the hospital at Elko, were placed anywhere space could be found. “We had the vice president of Standard Oil lying [on the floor] between two black porters on beds. They had better accommodations than the oil company official.”<sup>37</sup>

The news of the derailment captured the attention of the nation. People everywhere were all asking the same question: how could the most modern passenger train in service meet such a catastrophic end? For officials at the Southern Pacific Company, the initial evidence was chilling. At 8:30 am the morning following the accident, Southern Pacific President A. D. McDonald sent a telegram from the company headquarters in San Francisco to the company’s financial vice president John G. Walsh in New York advising him of the derailment. “Preliminary reports from company officers at the scene of the wreck indicate that this was caused by malicious tampering of rails” wrote McDonald.<sup>38</sup> The news spread quickly throughout the country. Even the bilingual *Brownsville Herald* at the southern tip of Texas would carry the news of sabotage, informing its readers that the “disaster was caused by a rail which was moved by a person or persons unknown.”<sup>39</sup>

In the following weeks the Southern Pacific Company would do all it could to conclusively find the cause of the disaster. A board of inquiry was formed in Carlin to interview employees of both the Southern Pacific and adjacent Western Pacific Railroad to investigate the

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<sup>36</sup> Hickson, 11.

<sup>37</sup> *Ibid.*, 15.

<sup>38</sup> A. D. McDonald telegram to John G. Walsh, August 14, 1939. Southern Pacific Transportation—City of San Francisco Wreck 1939 Collection, MS NC 505, Nevada Historical Society, Reno, Nevada.

<sup>39</sup> “Investigation in Train Derailment,” *Brownsville Herald*, Brownsville, Texas, August 14, 1939. Volume XLVIII, no. 36, page 1. Original in Spanish: *el desastre fué causado por un riel que fué movido, por una persona o personas desconocidas.*

actions taken by employees prior to, during, and following the wreck. The board of inquiry investigated train operations as well as maintenance and upkeep of the rights-of-way of both railroads through the Humboldt River Canyon. Simultaneously, the Interstate Commerce Commission, the federal agency responsible for railroad oversight, was beginning an independent investigation of its own.

Meanwhile, McDonald was assuring the public and fellow railroad men that all was being done to solve the case. “All the evidence points to the fact that the wrecking of the streamliner was planned with craft and deliberation” McDonald wrote in his first press release since the accident. “Southern Pacific railroad police are at work on the case.”<sup>40</sup> The officers from the Southern Pacific joined local officers from the Eureka and Elko County Sheriff’s Offices and state officers from the Nevada Highway Patrol who were already on scene beginning the investigative process.<sup>41</sup> Additionally, McDonald had also telegraphed J. Edgar Hoover, director of the Federal Bureau of Investigation, requesting the assistance of his agents in the investigation. McDonald wrote to Union Pacific Railroad president Hale Holden on August 22 informing him, “I have had several talks with Mr. Hoover over telephone and he assures me the F.B.I. will stay on the case to the end. He appreciates the importance of finding the guilty person as quickly as possible and has assigned to the case all the men he could spare.”<sup>42</sup>

Not everyone was content with the railroad’s claim of sabotage, however. On August 17, the *Los Angeles Daily News* carried an article entitled “Employee Group Hints Roadbed Unfit for

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<sup>40</sup> A. D. McDonald, Press Release, August 18, 1939. Southern Pacific Transportation—City of San Francisco Wreck 1939 Collection, MS NC 505, Nevada Historical Society, Reno, Nevada.

<sup>41</sup> Requests were sent to the Elko County Sheriff’s Office, Eureka County Sheriff’s Office, and Nevada Department of Public Safety under the Nevada Open Records Act in an effort to obtain documentation from these early investigations. None of the aforementioned agencies maintains records dating back to this period.

<sup>42</sup> A. D. McDonald letter to Hale Holden, August 22, 1939. Southern Pacific Transportation—City of San Francisco Wreck 1939 Collection, MS NC 505, Nevada Historical Society, Reno, Nevada.

Use.” The article centers on Ishmael Flory, secretary-treasurer of the Joint Council of Dining Car Employees, who stated “his organization was not satisfied that a saboteur caused the wreck of the streamliner ‘City of San Francisco.’” Flory wrote an open letter to Attorney General Frank Murphy urging him to look into the condition of the roadbed as a factor in the crash.<sup>43</sup>

Others looked not to the condition of the roadbed, but the speed of the train as a factor in the wreck. F. S. Foote who had suffered a concussion, punctured lung, four cracked ribs, a broken sternum, and a broken jaw as a result of the wreck stated that he was “very skeptical” of the railroad’s “sabotage story.”<sup>44</sup> Looking back on his experiences fifty years later, Foote would say “the sabotage story held up well enough, even though it was never really believed by those of us who were on the train.”<sup>45</sup> Chris Sheerin, then editor of the *Elko Daily Free Press*, would summarize it best in 1989 stating, “Sabotage, speed and a faulty roadbed have been blamed for the wreck. There is disagreement today, as there was at the time of the disaster.”<sup>46</sup> Now seventy-five years later, questions and disagreements still remain over the cause of the accident. A case can be made, however, to disprove those alternative theories which point to negligence on the part of the Southern Pacific Railroad.

When negligence is the cause of a major railroad accident, there are generally two areas in which investigators focus their attention: operational negligence and negligent maintenance. It is these same two categories that theories for those who would believe that the Southern Pacific Company was to blame for the wreck fall into. In regards to negligent maintenance, there were

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<sup>43</sup> United Press, “Employee Group Hinted Roadbed Unfit for Use,” *Los Angeles Daily News*, August 17, 1939. Clipping, Southern Pacific Transportation—City of San Francisco Wreck 1939 Collection, MS NC 505, Nevada Historical Society, Reno Nevada.

<sup>44</sup> Foote, “Detailed Account of my Recollection of City of San Francisco Accident.”

<sup>45</sup> Foote, “Recalling a Train Wreck,” 11.

<sup>46</sup> Hickson, 19.

groups who maintained that the roadbed was not maintained to an acceptable level thus leading to the derailment. For those who point to negligent operation, all the theories center on the control of the train under engineer Ed Hecox. The most popular of the theories claim that the train was traveling at an excessive speed in order to make up lost time leading to the derailment. Other theories suggest that Hecox failed to brake for a rock or other object on the rail, striking it, and causing derailment. Each of these theories will be examined in-depth to show how it could not have been the cause of derailment.

Let us return to Ishmael Flory and the Council of Dining Car Employees, for it is his open letter that points to the issue of negligent maintenance. “In the last few years there has been considerable curtailment of the money expended for the labor for the maintenance of the roadbeds of these carriers,” Flory wrote. “If it is found that the condition of the roadbeds are a factor in this wreck,” he continues, “this will represent criminal negligence against the employees and the public at large.”<sup>47</sup>

While Flory’s statements may appear slightly peculiar when juxtaposed against the claim of sabotage being presented by the authorities and the press, they are not without background or merit. This was, after all, still the years of the Great Depression. A study that same year observed that “in no period in railroad history has the degree of financial distress been as serious.”<sup>48</sup> Many roads throughout the nation were falling in serious decline. This claim can be further supported by the recollection of F. S. Foote. “Several remarks passed about the roughness of the roadbed since we left Ogden, and there was argument about the reason. Some said the Southern Pacific

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<sup>47</sup> *Los Angeles Daily News*, August 17, 1939.

<sup>48</sup> Quoted in Robert G. Gallamore and John R. Meyer, *American Railroads: Decline and Renaissance in the Twentieth Century* (Cambridge: Harvard University Press, 2014): 105

tracks were notoriously rough, while others said we were trying to make up time. The fact remains we were jostled considerably more than we had been since leaving Chicago.”<sup>49</sup>

However, the section of track on which the accident occurred was one of the main east-west arteries of the nation and as a result received a high volume of traffic. The Southern Pacific profited from this traffic, and thus, kept the track in good condition despite the hardships imposed by the depression. The track was composed of 130 pound rail, the highest strength in the Southern Pacific system at the time, and had been replaced in 1931.<sup>50</sup> The service life for a piece of 130 pound rail fluctuated depending on the environment and amount of traffic carried over it, however the mean service life was determined to be 22.5 years.<sup>51</sup> This places the track well within the acceptable limits of service.

Furthermore, the track had regularly been maintained. G. Bianchini was the section foreman for the 10 miles of track outside of Harney where the train met with derailment. Bianchini testified that he and the four men he supervised had made their most recent inspection of the track on Friday August 11, the day prior to the accident. On this occasion they found nothing wrong with the track. The most recent work they had done in the area where the derailment occurred had taken place five months previous when the crew raised the approach to the bridge.<sup>52</sup> T. L. Williamson, roadmaster for the section of track between Rose Creek and Carlin also testified to the condition of the track. Williamson had conducted rolling investigations in his motor car on August 4, 7, 10, 11, and 12.<sup>53</sup> Williamson had also conducted a

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<sup>49</sup> Foote, “Detailed Account of my Recollection of City of San Francisco Accident.”

<sup>50</sup> Interstate Commerce Commission, 3.

<sup>51</sup> J. B. Baker, “Economic Weight of Rail for Varying Traffic Conditions,” *Engineering News-Record* 85, no. 15 (October 17, 1920): 716.

<sup>52</sup> *Board of Inquiry Report*, 194.

<sup>53</sup> *Wallar v. Southern Pacific Company*, 37 F. Supp. 475 (N. D. Cal. 1941).

walking inspection of the track two weeks prior to the accident.<sup>54</sup> In all instances he found the track to be in good condition.

A bridge crew had been conducting regular maintenance on bridge number five which had ended on August 5. The bridge gang had then moved to bridge 4 which was 1,160 feet down track. The bridge gang passed over the spot of derailment four times on August 12 and found nothing wrong with the track conditions. Additionally, a freight train had passed over the same track between 6:10 and 6:20pm on August 12; the crew of that train testified that they saw nothing unusual along the track.<sup>55</sup> The track was also inspected independently by the Interstate Commerce Commission in their investigation following the wreck. The commission's report states, "The Commission's inspectors examined the track to a distance one-half mile east of the point of derailment and found it to be maintained in excellent condition."<sup>56</sup> All the evidence shows that the Southern Pacific was maintaining its track, and that there is nothing to show the track was in poor condition at the time of the derailment. Therefore, negligent maintenance can be ruled out as a cause.

The next theory that is often pointed to as the culprit behind the derailment is the speed at which the train was traveling. This issue is constantly alluded to in the recollections of F. S. Foote as he talks about the train being late, and staff telling him not to worry, they can make up the time traveling through the Nevada desert. The speed of the train is also one of the specific allegations cited by Eleanor Wallar and her husband when they brought suit against the Southern Pacific Company seeking compensation for injuries sustained as a result of the train wreck.

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<sup>54</sup> Ibid., 198.

<sup>55</sup> *Wallar v. Southern Pacific Company*.

<sup>56</sup> Interstate Commerce Commission, 26.

Speeds along the route of travel are meticulously adhered to. Excessive speeds would not only exert more force upon the rail leading to higher maintenance costs, but would also provide a rough ride for passengers. In an era before radio communication with dispatchers, movements along sections of track were dictated by timetables. The tables were used by dispatchers to determine where a train would be along its route based on the speed allowed and distance traveled. These speeds could be amended through special train orders issued to crews at stations in their route. Both the Interstate Commerce Commission and Board of Inquiry reports indicate that the Southern Pacific was using timetables and train orders on the night of August 12. Therefore, one can easily compare the distance traveled and the length of time it took to traverse with the allotted speeds to determine if the train was traveling too fast.

The controlled speed through the curve at which the train derailed was sixty miles per hour. The curve was three degrees with a superelevation (bank) of 4 ½ inches. The Southern Pacific's engineers calculated sixty miles per hour as the maximum speed over the curve (see Figure 4).<sup>57</sup> The speed was indicated on a speed board (similar to a speed limit sign on a highway) approaching the winding canyon country and complied with by engineer Hecox. Hecox testified that as he approached the sign he powered down the locomotive from sixty five to sixty miles per hour. The speed was verified by a speedometer in the cab. When asked if he checked the speedometer at any time after the speed board, Hecox responded "I hardly ever take my eyes off the speedometer."<sup>58</sup>

The testimony of head-end brakeman Elmer J. Thomas can provide an accurate accounting of the train's movements and speeds upon leaving Carlin and culminating with the

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<sup>57</sup> Southern Pacific Company. *Table 507—Speeds of Trains Through Curves*. 1939. City of San Francisco Derailment Collection, MS-39. California State Railroad Museum Library, Sacramento, California.

<sup>58</sup> *Board of Inquiry Report*, 5-6.

derailment just before bridge five. According to Thomas, the train left Carlin at 9:15 pm. Thomas had compared his watch to the station clock as required by regulation, and his watch had officially been compared and recorded in accordance with Southern Pacific's time service rules just four days prior on August 8<sup>th</sup>.<sup>59</sup> The train continued at a speed of sixty miles per hour until reaching the town of Tyrol. The train continued through the town at speed until reaching a point two miles west of Tyrol where speed was reduced. The train then traveled through the canyon and tunnel outside of Palisade at forty-five miles per hour. At that point there was a speed restriction in place through Palisade, so the train accelerated to the allotted speed of fifty-five miles per hour.<sup>60</sup> The train continued at this speed until reaching the town Gerald where maximum speed allotted was sixty-eight miles per hour. However, Hecox would testify that it was hard to get the train to that speed in the mountainous country and instead traveled at a speed of sixty-five miles per hour. The train continued at this speed until slowing for the aforementioned speed board prior to curve where the train would derail.<sup>61</sup> The train met with derailment at 9:33pm.

With an average speed of sixty miles per hour, it would take the train sixteen minutes to travel the sixteen miles between Carlin and the point of derailment. Given the fluctuations in speed, however, the eighteen minutes elapsed would be an appropriate amount of time to have elapsed. If the train were traveling faster than allotted, it would have arrived at the point of derailment much earlier. Additionally, those traveling on-board would have noticed. Brakeman Thomas was specifically asked if the train had exceeded its speed limit between the slow board and the point of derailment. Thomas responded, "I am positive it was not because we get

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<sup>59</sup> Ibid., 102.

<sup>60</sup> *Board of Inquiry Report*, 113-114.

<sup>61</sup> Ibid., 6.

accustomed to that. We can more or less tell very easily whether we are running slow or fast and the minute we hit a curve faster than should we can tell by the action.”<sup>62</sup> Furthermore, Division Engineer Weeks calculated that the locomotive and train set traveling through that curve would have to be traveling at a speed of 123.9 miles per hour before enough force could be generated to overturn the train.<sup>63</sup> Therefore, given the known speeds and time traveled over distance, combined with known speed required for overturn to occur, one can only conclude that the train was traveling within the acceptable speed parameters.

Other questions of operational negligence point to inappropriate actions taken by engineer Hecox. One suggestion follows Hecox’s initial report that he believed he had struck a rock or other object on the track that resulted in the train’s derailment. “It first occurred to me that someone had placed a rock and we had struck it,” Hecox testified. “[I] looked at the pilot to see if it was marked and there was no mark.”<sup>64</sup> Electrician I. L. Bauman who had been in Power Unit 2 at the time of derailment also took a look at the pilot and “could find no evidence of striking anything.”<sup>65</sup> Photographs taken of the pilot of the locomotive at the scene also clearly show that there was no damage caused by striking an object. There is no evidence to support this claim.

If there is no evidence to support an assertion of negligence, then one must look at the evidence in support of the case of sabotage. The conclusion of the Interstate Commerce Commission’s investigation was “this accident was caused by malicious tampering with the track.” The ruling from an independent agency reflected the early cause determined by the

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<sup>62</sup> Ibid., 113.

<sup>63</sup> Ibid., 216.

<sup>64</sup> *Board of Inquiry Report*, 2.

<sup>65</sup> Ibid., 55.

Southern Pacific Railroad in its Board of Inquiry investigation. This begs the question of how exactly was the track tampered with, and how can one conclude it was a malicious act?

Evidence from the scene found that the outside rail had been moved out of alignment forming a derailer (see Figure 5).<sup>66</sup> A derailer is a section of rail that intentionally forces a train off a track. In the case of the *City of San Francisco*, the outside rail had been moved inward  $4 \frac{5}{8}$  inches from the normal alignment of the rail. To accomplish this, several spikes had to be removed first in order to move the rail out of alignment. Additionally, the rail was separated at a connecting joint where two rails were joined together. This meant that in order to move the rail, the angle bars and bolts joining the two pieces together would also need to be removed. The tie plate connecting the rail to the tie was re-aligned to the new inward position and then the rail moved over the tie plate and partially respiked to hold the rail in place (see Figure 2).<sup>67</sup> The bond wires, which if broken would trigger a stop indication on the block signal, were straightened out but kept intact so as not to be broken. Finally, the exposed portion of the misaligned rail was painted so that a locomotive headlight would not reflect off the metal and the tumbleweed placed over the spot to further obscure the tampered rail.<sup>68</sup>

Every piece of evidence indicates sabotage. The location where the derailment occurred was in rough country at the furthest point away from towns and roads, away from prying eyes. The bolts which held the angle bars and joined the rails were found intact, not sheered, which meant the bolts had to have been removed and could not have fallen out of place from damage or

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<sup>66</sup> United States Interstate Commerce Commission. Report of the Director Bureau of Safety: Accident on the Southern Pacific Railroad, Harney, Nevada, August 12, 1939, Investigation no. 2375. United States Government Printing Office: Washington, D.C., 1939, 6.

<sup>67</sup> Unknown Photographer. City of San Francisco Wreck Collection, Photograph 739-6, Northeastern Nevada Museum, Elko, Nevada.

<sup>68</sup> Interstate Commerce Commission, 29, 32-33.

forces acting upon them. By moving the rail inward, this would have forced the train off the rails to the left of the direction of travel. Damage to the wood ties as a result of the flanged wheels of the train traveling over them are damaged on the left hand side of each rail beginning at the point of sabotage and continuing to the point where the locomotive came to a stop. Investigators found no other evidence of derailment or dragging equipment preceding the point of the misaligned rail indicating derailment began at that point. Furthermore, the equipment required to conduct such an act, combined with the efforts to keep the bond wire intact and obscure the sabotage all suggest that the individual(s) had a strong knowledge of how the Southern Pacific constructed and maintained its track.

There remains, however, one final possibility which must be disproven before one can definitively lay the cause to sabotage: cover up. Joe Bell accompanied his father, a Beowawe constable, to the wreck that night. “As we walked up the hill we heard the pounding sounds of spike mauls,” he recalled. “We climbed up the tracks and recognized the section foreman who was a friend and neighbor... we looked under the car and it looked like they were moving a rail... The next morning, we saw the headlines: ‘Sabotage!’ We questioned that in light of what we had seen and what we thought were other discrepancies.”<sup>69</sup>

Bell’s statement can be countered by another eyewitness, Roy C. Mills. “Joe Bell and his dad were right. They saw the crew working under the car. That car had only its front wheels off the tracks and the men were getting the car back on the tracks.”<sup>70</sup> While the efforts to rerailed the car are not specifically mentioned in any testimony, it is known that the car was rerailed and

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<sup>69</sup> Hickson, 7.

<sup>70</sup> Ibid.

pulled out of the scene with several passengers on board. This alone cannot disprove the claim that employees created the appearance of sabotage.

Roadmaster T. L. Williamson testified that he was unable to fit in the space between the tie and partially derailed *Union Square* car which lay over the spot where the rail was tampered by crawling on his hands and knees. Williamson said he had to squirm in order to fit in the gap. He estimated that the space between the ties and the car to be no more than twenty-four inches.<sup>71</sup> If the space between the car and tie was only twenty-four inches, there would have been no way for the Southern Pacific to create the appearance of sabotage after the fact. The claw bar used to extract rail spikes was five feet long. One would be unable to fit the bar in the limited space to pull the spikes up to realign the track. If one were to shorten the bar to fit, then it would not be possible to gain enough leverage to remove the spikes.<sup>72</sup>

Further evidence points to the fact that the rail had already been misaligned causing the accident. The front left wheel of the locomotive (see Figure 3) was knicked as it struck the misaligned rail. The tampered rail was also chipped in a manner consistent with being struck by the flange of a moving train wheel. P. E. Graf, a mechanical engineer from Elko with no ties to the Southern Pacific, testified to seeing the chipped rail at the scene. When asked of the nature of the mark, Graf indicated that he believed the mark to be a “straight dent blow.” Graf repeatedly stated the dent could not have been caused by friction, and when asked what he thought caused the mark stated, “I believe the rim of the wheel struck it.”<sup>73</sup> The wheel of the locomotive could

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<sup>71</sup> *Board of Inquiry Report*, 206.

<sup>72</sup> *Board of Inquiry Report*, 27.

<sup>73</sup> *Board of Inquiry Report*, 50-52.

not have struck the misaligned rail if the rail was moved out of place after the fact. Therefore, the sabotage must have been conducted prior to the train's arrival at that spot.

Another misconception commonly alluded to is that the agents of the Federal Bureau of Investigation disagreed with the railroad's finding of sabotage. In his article "Recalling a Train Wreck" Howard Hickson twice states that the F.B.I. disagreed with the conclusion of sabotage. If this is the case, why does the evidence speak to the contrary? In the case of *Wallar v. Southern Pacific Company*, the F.B.I. presented its case files to the court which consisted of over 850 pages and 202 photographs. If the F.B.I. disagreed with the conclusion of sabotage, then why did the Bureau provide evidence alluding to sabotage to the Federal District Court? Furthermore, documents obtained through a Freedom of Information Act request show that the Bureau was continuing to follow up on leads into the case nearly thirty years later.<sup>74</sup> Surely the Bureau would not continue to search for a sabatuer it did not believe existed for several years following the incident.

Perhaps the greatest proof that sabotage was indeed the cause of the wreck was the finding of the court in the *Wallar* case. Here, evidence was presented to support both the suspicion of negligence and a cover up by the railroad along with the evidence to support a finding of sabotage. In his oppinion Judge St. Sure wrote, "The testimony offered to support the theory that the evidence of derailment was manufactured after the wreck by employees of the defendant railroad company is wholly insufficient and insubstantial. A suggestion so incredible

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<sup>74</sup> See United States Department of Justice. Federal Bureau of Investigation. *Special Agent in Command, Las Vegas Transmitting Memorandum to Special Agent in Command, Sacramento Regarding City of San Francisco Derailment of Southern Pacific Train Near Harney, Nevada, 8/12/39; FTWS.* November 26, 1965, and United States Department of Justice. Federal Bureau of Investigation. *Special Agent (Name Withheld)Transmitting Memorandum to Special Agent in Command, Las Vegas Regarding City of San Francisco Derailment of Southern Pacific Train Near Harney, Nevada, 8/12/39; FTWS.* December 23, 1965.

cannot be sustained against the indisputable physical facts... Upon a careful consideration of the whole case I am of the opinion that the plaintiffs have failed to sustain the burden of proof by a preponderance of evidence.”<sup>75</sup> The court sided against the Wallars in every point of their argument.

Though no suspect was ever brought to justice, those investigating the wreck strongly believed the culprit to be a former employee of the railroad. The area in which the wreck was staged, the deliberate and methodical manner in which it was undertaken all point to someone familiar with Southern Pacific operations. Jobs were a prized commodity during the depression, and it would be no far stretch for an individual who lost his job to become disgruntled and retaliate against his former employer.

Given the fact that a freight train had traveled over the site where the accident was to occur just hours before, one can only conclude that the *City of San Francisco* was specifically targeted. Not only was this train the pride of the Southern Pacific, but it was also a luxury liner, a train full of those with means in a time where many were simply struggling to get by. Targeting this train would ensure maximum publicity, and by default, bring negative attention toward the Southern Pacific.

For too long mystery has surrounded the events that occurred that August night. Though we will likely never know who was behind the malicious act that resulted in the deaths of twenty-four individuals, I believe it can firmly be established that sabotage was indeed responsible for the wreck of the *City of San Francisco*. Testimony offered by officials show the track was maintained, regularly inspected, and was in good working order. An independent

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<sup>75</sup> *Wallar v. Southern Pacific Company*.

agency, the Interstate Commerce Commission, conducted its own investigation and came to the same conclusion. Given the knowledge of distance the train traveled and the amount of time it took to traverse that distance, one can determine that the train was traveling within the acceptable parameters, and not at an excessive speed. A lack of damage to the pilot of the locomotive shows that the train did not strike an object. Furthermore, damage to the wheel of the locomotive indicates that the wheel struck a misaligned track. To do so, the track would have had to have been moved out of alignment prior to the locomotive reaching that point. Given this knowledge and the limited space at the point of misalignment, the evidence of sabotage could not have been staged after the fact. Finally, all major parties who investigated the wreck determined the cause to be sabotage. Even when a civil case was brought in Federal Court, no evidence could be found to support any instance of negligence or cover-up by the Southern Pacific. The question that remains, is why?

I began this paper by talking of the lavish amenities that the *City of San Francisco* offered its patrons. This stands in stark contrast to the hardships that many in the country were still experiencing. This was a time where “all across the country, desperate young men were reaching for the grab irons of boxcars,” and countless men crisscrossed the country by hopping a freight.<sup>76</sup> For those struggling simply to survive, the *City of San Francisco* was a nagging reminder that not everyone knew what it meant to suffer, that there were those who still found luxury in the midst of despair.

Similarly, the Southern Pacific Railroad had long held a special place of disdain in the hearts of many citizens of the west coast. Though the progressive movement had curtailed some

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<sup>76</sup> James R. Chiles, “Halelujah I’m a Bum,” *Smithsonian* 29, no. 5 (August 1998): 66.

of the company's political clout, the company's economic control over the west still resembled the octopus depicted by G. Fredrick Keller half a century prior.<sup>77</sup> With the mounting economic hardships of the depression, any drop in traffic could very well lead a railroad to insolvency. The Southern Pacific was no different.

When one understands the underlying economic dichotomy, suddenly much of controversy surrounding this event comes into clearer focus. An event of this magnitude had the ability to ruin the Southern Pacific Company. If the railroad were to lose the trust of the public, ridership would decrease and freight shippers could move their business elsewhere. The railroad would not be able to absorb such a loss and its future would most certainly be in doubt. It is for the company's future which the Southern Pacific battles in the months following the derailment.

For Ishmael Flory and the Council of Dining Car Employees the condition of the roadbed and track was a legitimate concern based on trends across the nation to defer track maintenance. For the Southern Pacific, the suggestion that one of the most highly traveled sections of its network was in disrepair was an allegation with potential serious repercussions. If a train derailed on their best section, then surely the safety of the rest of the route would be questioned. It is for this reason that Joe Bell's suggestion of a cover-up by the Southern Pacific was seen at the time, and continues to be seen by individuals today, as plausible. After all, it was the Southern Pacific who had everything to lose.

Yet one also finds the depression at play in the work of the saboteur. A job was a highly prized commodity during the depression, and a railroad job was a good job to have. Despite the

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<sup>77</sup> The Southern Pacific gained the derogatory characterization of an octopus from the political cartoon "The Curse of California" in the San Francisco magazine *The Wasp*, August 19, 1882. The image formed the inspiration for the title of Frank Norris' *The Octopus: The Story of California* which was highly-critical of the railroad monopoly in California. Though the story uses fictional characters and a fake railroad, the events were based on experiences of California farmers and ranchers in their fight against the Southern Pacific. The characterization stuck.

negative image of the Southern Pacific among the populous at large, the railroad took good care of its employees offering decent pay, advancement opportunities, and a healthcare plan for all employees that became the model for the major American railroads.<sup>78</sup> Because of the manner in which the sabotage was conducted, the perpetrator would have had to have been a former railroad employee. The saboteur would have had to have known which tools to acquire in order to pull the spikes, remove the angle bars, push over the rail, and re-spike it into its new position. The saboteur would not only have had to have known about the bonding wires at the rail joints, but would also need to know that the Southern Pacific looped their bonding wires, allowing the saboteur to extend the wire without severing it and tripping a stop signal on the block.

Furthermore, there was a joint track operation in place between the Southern Pacific and Western Pacific Railroads; not only would the saboteur be required to know that westbound trains utilized the Southern Pacific tracks, but one would need to know which of those two sets of rails belonged to the Southern Pacific. Taken together, one can only conclude that such extensive knowledge was likely derived from having been employed by the railroad. In the turmoil of the depression, losing a railroad job could provide the motivation for seeking revenge.

Finally, we come to the targeting of the *City of San Francisco* itself. The Southern Pacific operated several well-known passenger liners such as the *Coast Daylight*, *Overland Limited*, and *Sunset Limited*. Yet the choice to target the *City of San Francisco* is in and of itself telling. The streamliner was the pride of the Southern Pacific, its modern flagship of the line. The streamliner was also a symbol of opulence. Targeting the *City of San Francisco* was sure to gain national

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<sup>78</sup> The Southern Pacific created a network of hospitals along its routes, and hired several doctors and nurses to ensure the best care for its employees and communities it served. Many of these medical professionals were dispatched to the wreck site following the derailment. For more information on the Southern Pacific's benefits and medical program see Richard J. Orsi, *Sunset Limited: The Southern Pacific Railroad and the Development of the American West 1850-1930*. Berkeley: University of California Press, 2007.

attention and cause the most harm to the Southern Pacific's image. It also had the added benefit of laying low those who had largely avoided the anguish felt by so many Americans during the depression.

Because no individual was ever apprehended and there remains no deathbed confession, we will likely never know who derailed the *City of San Francisco* or why. However, one cannot ignore the omnipresent role of the Great Depression in this incident. While one cannot point to any empirical evidence to substantiate this claim, it remains the only viable explanation for every portion of the event. Economic hardship caused by the Great Depression can explain why some individuals would claim negligence, why some would allude to a cover up, and why an individual would maliciously derail the *City of San Francisco*.

Figure 1



Earl Frantzen, "Southern Pacific Railroad (Streamliner) Wreck Near Carlin, 1939." Southern Pacific Transportation—City of San Francisco Wreck 1939 Collection, MS NC 505, photograph no. 277. Nevada Historical Society, Reno, Nevada.

Figures 2 and 3



Figure 2: Unknown Photographer. City of San Francisco Wreck Collection, Photograph 739-6, Northeastern Nevada Museum, Elko, Nevada.

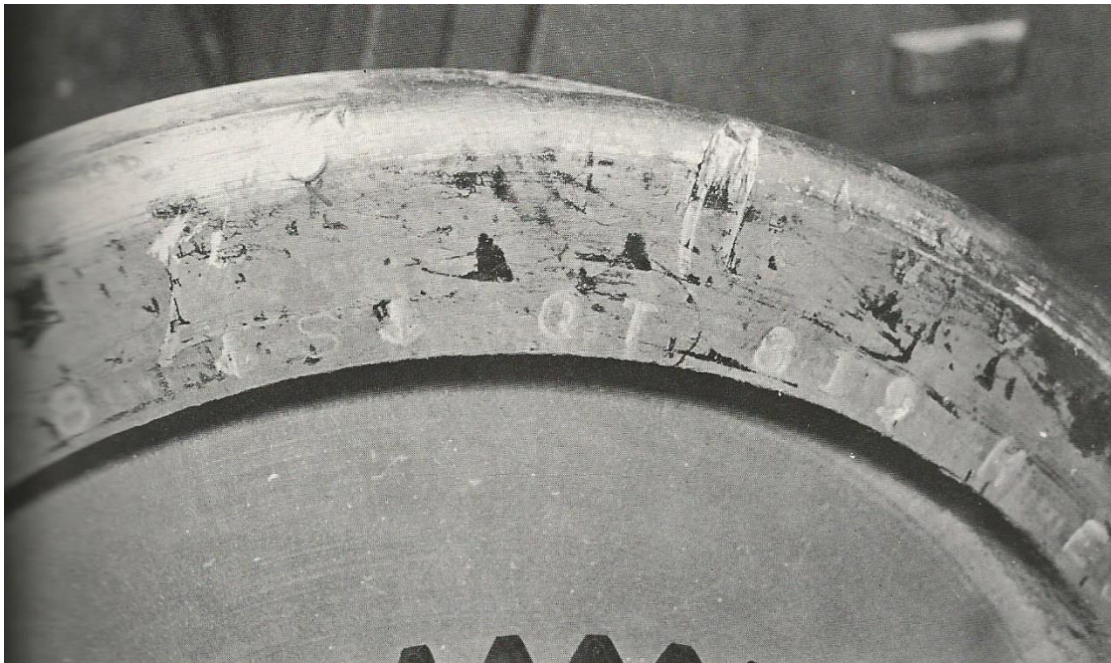


Figure 3: Unknown Photographer. City of San Francisco Derailment Collection, MS-39. California State Railroad Museum Library, Sacramento, California.

Figure 4

Maintenance of Surface—Elevation of Curves 5-43

TABLE 507.—SPEEDS OF TRAINS THROUGH CURVES

**SPEED TABLE FOR CURVES**  
 MAXIMUM SPEED IN MILES PER HOUR RECOMMENDED AS GOOD PRACTICE (NOT LIMITS OF SAFETY) WHERE CENTER OF GRAVITY IS 84 INCHES ABOVE THE TOP OF RAIL

M = Maximum Speed = Speed at 3° Unbalanced Elevation  
 C = Speed at Equilibrium Elevation

SPEED OF TRAIN IN MILES PER HOUR	ELEVATION OF CURVE IN INCHES											
	1	2	3	4	5	6	7	8	9	10	11	12
0*30	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1*00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1*30	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2*00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2*30	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3*00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3*30	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4*00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4*30	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5*00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
5*30	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6*00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
7*00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
8*00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
9*00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
10*00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
11*00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
12*00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Since the elevation required is a function of the train speed, the speed is the first element to be determined. In general, in determining speed for which a curve shall be elevated, it is necessary to consider the different speeds of which various classes of trains operate. Where conditions do not warrant greater speeds, equilibrium speeds, should be used. It is recommended that for good riding conditions on passenger trains and minimum wear on rail and equipment, the speeds be kept within the limits shown in this table. The limits as shown will also serve for use on any lower height center of gravity for traffic of one speed equilibrium elevation is the most economical. Where both fast and slow trains are operated on the same track, it is advisable to increase the speed limit of fast trains above those shown for equilibrium speed. For a preponderance of slow traffic where schedules make it necessary, and conditions of track permit, speeds up to the maximum shown may be used. It will be noted that for the sharper curves there is a wide difference in the number of miles per hour that may be run at each of the various super-elevations.

<sup>1</sup> Adopted, Vol. 37, 1936, pp. 468, 1015; Reference, Vol. 15, 1914, pp. 594, 1063.

1939

Southern Pacific Company. Table 507—Speeds of Trains Through Curves. 1939. City of San Francisco Derailment Collection, MS-39. California State Railroad Museum Library, Sacramento, California.

Figure 5

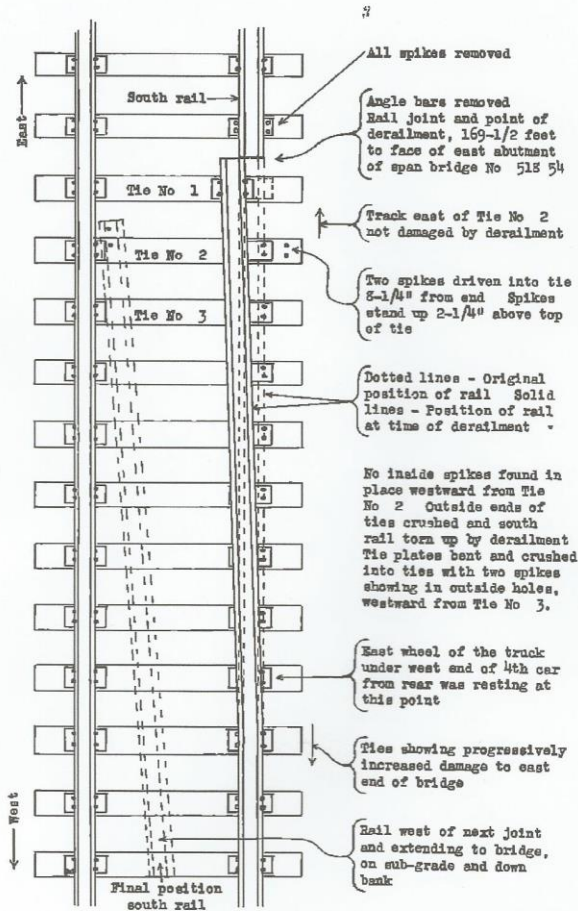


FIGURE 2—Sketch showing normal misaligned and final positions of rail involved

United States Interstate Commerce Commission. *Report of the Director Bureau of Safety: Accident on the Southern Pacific Railroad, Harney, Nevada, August 12, 1939, Investigation no. 2375.* United States Government Printing Office: Washington, D.C., 1939, 6.

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