UNION PACIFIC LOCOMOTIVE #119
AND
CENTRAL PACIFIC LOCOMOTIVE #60, JUPITER
AT PROMONTORY SUMMIT, UTAH, MAY 10, 1869

by

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REPORT ON JUPITER AND #119
CENTRAL PACIFIC AND UNION PACIFIC LOCOMOTIVES
AT PROMONTORY SUMMIT, UTAH, MAY 10, 1869

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This report was undertaken for the purpose of determining whether the National Park Service can carry out a stated objective in the development of the Golden Spike National Historic Site. This was stated explicitly in the Congressional Hearings, both in the House and Senate Interior and Insular Affairs Committees, during consideration of the Golden Spike bill in the 89th Congress, 1st Session. The bill was enacted as Public Law 89-102, approved July 30, 1965, authorizing the establishment of the Golden Spike National Historic Site. The Hearings indicated that the scene in which Union Pacific locomotive #119 and Central Pacific locomotive #60, Jupiter met, pilot to pilot, at Promontory Summit in the ceremonies on May 10, 1869 signalized the completion of the first transcontinental railroad, should be reconstructed.

The two locomotives that met at Promontory Summit will have to be represented by replicas if the Congressional intent and that of the sponsors of the legislation is to be carried out. The centennial date of the completion of the first transcontinental railroad at Promontory Summit is May 10, 1969. The Congressional intent as evidenced at the Hearings is that the National Park Service

should have its development of the area for public use substantially complete by that time. This includes the presence there of locomotives representing the two historic engines, on a stretch of track, at the site of the original ceremony a hundred years ago. The legislation authorizes the appropriation of not more than $1,168,000 to include cost of land acquisition and development of the area. This sum includes an estimated $200,000 for obtaining either original locomotives or the manufacture of replicas of Jupiter and #119.[1]

This report attempts to set forth the problems involved in recreating the Jupiter - #119 meeting, and of determining whether it can be done within the approximately $200,000 that is expected to be available for that purpose. In assuming this undertaking the National Park Service has before it no precedent, because never before has it been involved in providing so complex and sizeable antique machinery which is no longer manufactured in this country. When the writer undertook to prepare this report about seven months ago, the National Park Service did not even know the name of the manufacturer of the original Central Pacific locomotive #60, Jupiter, and one alleged expert who had been consulted on the point gave an answer that proved to be entirely erroneous. This report has been pursued as

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1. Roy E. Appleman 6-page memorandum to Chief, Division of Interpretation, January 14, 1966, analyses testimony of the Hearings on intent of legislation and commitments of Departmental and NPS witnesses.

time permitted from my regular duties. Mr. William C. Everhart, Chief of the Division of Interpretation and Visitor Services, and Mr. Howard W. Baker, Assistant Director, Operations, gave their verbal approval and support for the work.

Conclusions and recommendations resulting from the study will be summarized first. The body of the report, with its appendices, sets forth the materials and findings on which the conclusions and recommendations are based.

CONCLUSIONS AND RECOMMENDATIONS

1. There is not available either in the United States or elsewhere original locomotives similar to Jupiter or #119. Replicas will have to be manufactured.

2. In order to manufacture replicas that will stand any scrutiny for accuracy of reproduction and represent successfully the Jupiter and #119, working or construction drawings of the two locomotives will have to be prepared.

3. Such working drawings can be prepared from the basic source materials assembled in this report. This is not only my judgment, but more importantly it is the judgment of several of the best informed experts in this field whom I have consulted on the matter.

4. A mechanical draftsman, experienced in drafting of early railroad and locomotive equipment, will have to be employed to make these drawings, using the material presented in this report. I am prepared to make a recommendation as to the person with whom the Service should enter into a contract to do this work. It will require a month or more of continuous work to prepare the necessary drawings. The estimated cost, $1,500 - $2,000.

5. When the construction drawings are finished, copies should be sent to a number of prospective manufacturers to obtain tentative bids or estimates. Only when these have been received will the

Service know the probable cost of obtaining the two locomotive replicas. All figures used thus far are worthless, or nearly so. I make this statement based on the findings of this report and of conversations with several railroad officials, and one manufacturer of related types of equipment. The Service estimate given in development costs used in the Congressional Hearings was $200,000 for both locomotives--an average of $100,000 each. This was for a "shell", and not a working engine. I doubt that this will prove enough unless manufacture is in a foreign country.

6. When estimates of cost have been obtained in the manner outlined above, Service decisions will have to be made at once on whether to proceed with manufacture, and the entire interpretive development of the area formulated without delay if the development goal of May 10, 1969 is to be met.

7. The best informed opinion, both within the railroad world and among private students of the steam locomotive that I have consulted, favors a careful and authentic reconstruction in the replicas if they are undertaken, rather than an amusement park or Hollywood standard. I take this view. Any other is not worth the financial cost involved and would be below our announced integrity in the field of historical preservation and interpretation. There is a large and growing awareness throughout the country of this project, and strong support exists for the making of the replicas.

Method of Inquiry and Research

A word may be in order to explain the method followed in pursuing this study, since at the outset I knew very little about the technical characteristics of the 1869 locomotive or where information might be obtained quickly. I had no idea of whether getting the answers needed would take a day, a month, a year, or indeed whether they ever would be forthcoming.

My first move was to go to the library of the Association of American Railroads, in the Transportation Building, 17th and H Streets, here in Washington. The Association has one of the largest and most complete reference libraries in the world on American locomotives and railroad history. In a series of visits there and in discussions with staff members I learned that the library had no working drawings of any locomotive of the period, few historical photographs of the locomotives we were interested in, and that the answers we sought would not be forthcoming quickly from their files. With the help of Mrs. Rowland at the Library I did have quick access to certain published sources. Mrs. Frances Meilleur of the Public Relations Department and Mr. L. T. McDougle, recently retired from the Association, gave me valuable references to libraries, special collections, and authorities on railroad history and early locomotives. This was a valuable help and saved me much time.

Acting on the suggestions received from the staff of the American Association of Railroads I continued my search by visits to several of the more likely institutions, collections of railroad materials, and by correspondence with many authorities in the subject across the country. The American Railway and Locomotive Historical Society, with headquarters in Baker Library, Harvard University, has been helpful, and particularly through its Pacific Coast Chapter, of which Mr. Fred A. Stindt, of Redwood City, California, is chairman. In March at its annual meeting and dinner, the Pacific Coast Chapter of the Society discussed the #119 and Jupiter problem confronting the National Park Service. As a result, Mr. Stindt asked Mr. Gerald M. Best of Beverly Hills, California, a recognized railroad historian and resident Pacific Coast vice-president of the Railway and Locomotive Historical Society Mr. Best is also vice-Chairman of the Pacific Coast Chapter of the Society, to assist us in our work. Mr. Best has done so in correspondence and in giving a full day of conference with me early in May at his home. His assistance has been graciously offered on a continuing basis as needed. Mr. Best has been of important assistance to me.

Another person who should be mentioned specially as having given freely of his time, knowledge, and in suggestions is Mr. John A. White, Jr., Chief, Land Transport Division, National Museum, Smithsonian Institution. His assistance also is available on a continuing basis.

The body of the report, in its references and footnotes, will reflect the nature of help from many other persons and institutions.

THE 4-4-0 STANDARD AMERICAN LOCOMOTIVE

Before discussing the two locomotives that are the principal concern of this study, it may be well to describe briefly the locomotive type into which both the #119 and Jupiter fell. They were both 4-4-0's, 8-wheelers, and typical of the Standard American locomotive. The series of numbers in the term refer to the number of wheels a locomotive has; the first digit refers to the number of pilot wheels, the second digit to the number of driving wheels, and the third digit to the number of trailing truck wheels behind the drivers. This means that both the #119 and the Jupiter had 4 small pilot wheels and 4 drivers, but no trailing wheels.

The first 4-4-0 steam locomotive was built in 1837. The year before, in February, Henry R. Campbell of Philadelphia obtained a patent for an 8-wheeled engine, 4-wheel truck in front and 4 driving wheels. James Brooks of Philadelphia began building the engine a month later, and it was completed May 8, 1837.[2] This was the first of its type, and from it derived the two locomotives that met at Promontory, and all the many thousands of the Standard American 4-4-0 that operated in the United States in the last six decades of the 19th Century.

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2. Louis T. Peale, ed. and compiler, The History of the American Locomotive, illustrated with original engravings, Phila., Pa., The Scott Publishing Co., 1887, 46. The first 4-4-0 had 18 inch cylinders with a 12 inch piston stroke, 44 inch driving wheels, and weighed 12 tons.

Some authorities think "American Standard" is a preferable termonology to "Standard American" which I have used in this report in referring to this 8-wheel engine.

Because the 4-4-0 engine became outstandingly popular and successful, it became known as the Standard American. It was built increasingly in the 1850's and through the rest of the century. It was the type commonly in use on American railroads during the Civil War period, the subsequent period of building the transcontinental railroads, and the great period of railroad expansion in the United States. The Standard American engine was used in decreasing number after 1900, the last of standard gauge being manufactured in the 1920's. Baldwin built two 4-4-0 locomotives, 3-foot gauge, for Yucatan Railways in July 1946. These were the last built in this country as far as the writer knows. There are no 4-4-0's in use today on regular run standard gauge track in the United States or Canada.[3]

All the early famous manufacturers of railroad locomotives built the 4-4-0. Such well known firms as Baldwin, Mason, Cooke, Danford, Rogers, Schenectady, and Hinkley were household names in locomotive manufacture. Three manufacturers (Grant, Rogers, and Cooke) were located in Paterson, New Jersey, at one time. At first, the locomotives needed for motive power to serve the developing trackage in the United States were made in any large machine shop that desired to undertake the task. For many years the various makers incorporated special decorative design

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3. Paul T. Warner, "The 4-4-0 (American) Type of Locomotive," The Railway and Locomotive Historical Society Bulletin No. 35, October 1935, 10-37, is perhaps the best discussion available of the origin and subsequent development of the 4-4-0 in the United States. Also of some interest is H. L. Kelso, "Eight-Wheelers," Railroad Magazine, February 1957, 18-27. Ltr. Gerald M. Best to Roy E. Appleman, August 10, 1966.

and other features into their at first crude models. William Mason of Taunton, Massachusetts is generally credited with being the Master Stylist who perfected the classic design of the Standard American 4-4-0. The Standard American is identified with the Golden Age of railroading in the United States. No other locomotive design, steam or otherwise, has ever held a comparable place in the history of railroad operation over as long a period of time. And most students of the subject maintain that no other locomotive type ever approached it as a creation of beauty. Both the Jupiter and the 119 were representatives of the Golden Age of the Standard American 4-4-0.

The American Standard Locomotive as a Thing of Beauty

In the hey-day of the American 4-4-0, the locomotive was in a real sense a handicrafted thing of beauty. There were many manufacturers of the early locomotive, the industry resembling that of the automobile in its early days before the shakedown came that resulted in failures, mergers, and the emergence of only a few giant manufacturers. In this early stage any big machine shop could undertake the manufacture of locomotives and each had its individuality in design and decoration. This was markedly so in the 1860's when the Jupiter and #119 were built.

The locomotive of this time was highly attractive in the dark slate gray of its boiler jacket covering of Russian iron, red wheels and pilot or cow catcher, red smoke stack, varnished hardwood cab of (generally black, however, as color tended to disappear when the engine got hot)

walnut, gold leaf lettering on green, and generally a painted scene or figure on the headlight and sandbox. To give the final touch there was a liberal use of brass as a material, and this was kept highly polished and gleamed like gold in the sunshine. The locomotive engineer of the period pampered his engine and kept it clean and highly polished as one would of something he was proud of and wanted to look always at its best. Old-timers say and have recorded that it was usual to see an engineer out cleaning and polishing his locomotive whenever the train stopped and he had an opportunity to do so.

It should be kept in mind that both #119 and Jupiter were new locomotives, only a few months in service, when they met at Promontory. And one can be sure they were groomed to look their rival best on that occasion.

The decorative paint schemes of locomotives of this time can be seen in numerous Currier and Ives lithographic color prints and other color prints showing locomotives of the period. Although none are known to be in existence for either #119 and Jupiter, it is certain that these two followed the general practice of the time and were similar in decoration.

A few examples showing the highly decorative character of the early 4-4-0 may be of interest. There follows a description of what Central Pacific locomotive #1, the Governor Stanford, looked like when it was new in 1863.

"On November 9 the cannon saluted the Governor Stanford in a heart-stirring suit of paint, as it chuffed along the track for the first time. The wood-burning locomotive, about twice the height of a tall man and 50 feet long, included its maroon tender, was a splendid sight. Its four driving wheels, 4½ feet in diameter, were bright red, with a gold star painted on each hub. The driving rods and pistons were of brass, butter-colored and glowing in the sunlight. So were the bell, with its orange clapper, and the bands that girdled the gray-blue boiler. The locomotive's cab was maroon outside and apple green inside. Its name was painted in gold letters beneath the windows, whose frames were the color of ripe lemons. Vivid green fenders hooded the driving wheels, and above them on each side of the cab was an orange step for the crew to use for climbing aboard. The smokestack and wooden slats of the cowcatcher were as red as the driving wheels. The headlight was maroon, with a fat kerosene lamp sitting inside in front of a glistening reflector. Huge gold initials, 'C.P. R.R.,' decorated the tender's dark-red sides, which bore a chirpy stripe of orange along their base. Locomotive and tender, when carrying a full load of water and wood, weighed 46 tons." [4]

Schenectady, which built Jupiter, constructed the Commodore Vanderbilt for the Rensselaer & Saratoga Railroad in 1872. Here is what it looked like:

"Her drivers were a brilliant red and the spokes striped with gold, with a large gold star on each hub. Smaller gold stars adorned the wheel rims. Her overall coloring was green and red, gold-leaf lettering in script. Portraits of the handsome Commodore himself were painted in color on two sides of her box head-light." [5]

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4. Alfred W. Bruce, The Steam Locomotive in America: Its Development in the Twentieth Century, New York, W. W. Norton & Company, Inc., 1952, 39-40. Hereafter cited as Bruce.

5. H. L. Kelso, "Eight-Wheelers," Railroad Magazine, February, 1957, 19.

Perhaps the best source for a study of paint and decoration color schemes for the early locomotives is to be found in the color lithographs issued by the various makers for their locomotives. See John H. White, Jr., "Locomotives on Stone," Smithsonian Journal of History, Vol. 1, No. 1, Spring, 1966 for the best discussion of this subject. Charles E. Fisher in The Railway and Locomotive Historical Society Bulletin, No. 35, October, 1934, 38-51, gives a list of lithographs.

Another writer said of these early locomotives, "For sheer beauty of Victorian design the American locomotive of the seventies cannot be surpassed. What colorful characters these engines were! They wore bright paint and brass trinkets and their proportions gave them a distinctly theatrical appearance."[6]

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6. Ward Kimball in Foreword, Graham, Hardy, and Paul Darrell, American Locomotives 1871-1881, Oakland, California, 1950."

THE UNION PACIFIC LOCOMOTIVE #119

By the Act of July 1, 1862, Congress authorized the building of the Union Pacific Railroad. But it was not until the following year, in March 1863, that Congress in another bill established the gauge of the projected railroad at 4 feet, 8½ inches--since known as standard gauge. California wanted a 5-foot gauge; Lincoln favored that gauge. One railroad in New England at the time had a 7-foot gauge. There were many different gauges in use throughout the country. But as it turned out, the political combine with the most strength succeeded in securing legislation for the 4 foot, 8½ inch gauge.[7] Thus both the Union Pacific and Central Pacific had to build to that gauge and obtain locomotives to operate on that gauge track.

The Central Pacific broke ground at Sacramento on January 8, 1863, the Union Pacific at Omaha on December 2, 1863. But neither the Union Pacific building from the east nor the Central Pacific building from the west was able to do much until the Civil War ended. With the end of the war, iron and other construction materials and a man-power labor supply became available. Both railroad companies began purchasing rolling stock in some quantity in 1866. In that

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7. John P. Davis, The Union Pacific Railway: A Study in Railway Politics, History and Economics, Chicago, S. C. Griggs and Company, 1894, 114-115. Hereafter cited as Davis.

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year the Union Pacific had 25 locomotives, all wood-burners, and each weighing between 25-35 tons.[8] At first, the Union Pacific followed the practice of giving names to its locomotives as well as numbers. The General Sherman was U.P. #1. Others were named after Civil War generals, and a few were given geographical names. But sometime in 1866 the practice of naming U.P. locomotives ended.[9] According to the Union Pacific list of locomotives, only the first 21 received names.[10] Accordingly, #119 never officially had a name.

The sister locomotives of #119 seem to have the same decoration on the sandbox, although this is not altogether distinct in the pictures available.

I have seen occasional references to Union Pacific #119 as "The Plainsman," or "Pride of the Prairies," I was unable to discover the reason for the name until I noticed that the picture painted on the sandbox of the engine seemed to represent a plainsman. I assume, therefore, that the name derived from that decoration on #119. Both the Union Pacific and the Central Pacific numbered their locomotives serially as they acquired them. Thus #119 stands in that sequence among the locomotives acquired by the Union Pacific.

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8. Wesley S. Griswold, A Work of Giants: Building the First Transcontinental Railroad, New York, Toronto, London, McGraw-Hill Book Company, Inc., 1962, 171. Hereafter cited as Griswold. This is the best researched, best balanced, and most reliable general history of the building of the Union Pacific and Central Pacific Railroads. Mr. Griswold is West Coast editor of Popular Science Monthly.

9. Griswold, 170.

10. Copy of Union Pacific List of Locomotives in possession of Mr. Gerald M. Best, 511 North Sierra Drive, Beverly Hills, California, and examined by Roy E. Appleman, May 3, 1966; the same list subsequently consulted at offices of Union Pacific Railroad, Omaha, Nebraska.

The first U.P. locomotives were delivered to St. Joseph, Missouri on railroad flatcars on the St. Joe Railroad. There they were transferred to Missouri River steamboats and moved upstream to Omaha where they were unloaded. This short river trip cost about $1,000 per locomotive. At this time there was no railroad connection from the east with Omaha. The nearest approaching railroad was the Chicago & Northwestern Railroad building through Iowa. The U.P. soon found that it could get its locomotives to Omaha cheaper by hauling them by ox-teams from the Chicago & Northwestern Railhead 100 miles east of Council Bluffs, then ferry them across the river to Omaha, than to move them upstream from St. Joe by river steamer, and this method was generally followed.[11] ~~I assume that~~ The #119 may have arrived at Omaha by this method, although I have seen no documentation to prove it. On the other hand, the Chicago & Northwestern Railroad was running a daily service to the Missouri River ferry station west of Council Bluffs, Iowa, as early as May 3, 1868, apparently, and it would appear likely, therefore, that the #119 would have been delivered by rail to the Missouri River ferry opposite Omaha.

It will be noted, in this connection, that although the Central Pacific had to transport its locomotives around South America and Cape Horn by sailing vessels to California or carry them across the Isthmus of Panama by the isthmus railroad to a second ocean-going vessel, the Union Pacific had its own kind of problem of getting locomotives and rolling stock to its eastern terminus at Omaha.

About the time the transcontinental railroad was completed the Union Pacific reported that it had bought 68 new passenger locomotives

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11. Griswold, 136; Ltr., Gerald M. Best to Roy E. Appleman, August 10, 1966. Best has a copy of a C & NW Timetable, dated May 3, 1868 which shows service to the Missouri River ferry at Council Bluffs.

for through traffic at a cost of $14,000 each, or a total of $952,000. Passenger cars at the same time cost $6,000, box cars $900, and baggage, mail, and express cars $3,800.[12]

The Central Pacific Railroad at the same time had about 1,000 men employed at its Sacramento shops, and its rolling stock consisted of about 150 locomotives, 1,400 platform cars, 360 box cars, and 17 mail and baggage cars.[13]

Union Pacific locomotive #119 was built by the Rogers Locomotive and Machine Works of Paterson, New Jersey, and completed on November 19, 1868. It was one of 5 freight engines the Rogers Company built from one order, all designed to burn bituminous coal that the Union Pacific had discovered in workable quantities in western Wyoming. These five locomotives were numbered 116 through 120, and can be called sister locomotives because all five were built from the same specifications and looked alike.[14] This is important to know because a good

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12. American Railroad Journal, XXV, No. 23, June 5, 1869, 645.

13. Ibid, XXV, No. 23, June 5, 1869, 617.

14. List of Union Pacific Locomotives at the Union Pacific Railroad, Omaha, Nebraska; copy of same list is in possession of Gerald M. Best; Rogers Locomotive Factory List of locomotives in possession of John A. White, Jr., Chief, Land Transportation Division, National Museum, Smithsonian Institution, gives the dates of completion of #119 and its four sister locomotives, as follows: #116, October 23, 1868; #117, October 27, 1868; #118, November 18, 1868; #120 November 21, 1868. Thus, #119 was completed one day after #118 and two days before #120. It will be noted that all are in consecutive number according to date completed.
#119, November 19,

photograph of any one of them will show the characteristics of the others. The only differences might be the pictorial decorations on the headlight and the sandbox. These locomotives had extended smokeboxes because they were coal-burners and needed the additional length and space for cinder screens. Hence the headlights rested on the end of the smokebox rather than being carried on a bracket that extended in front of the smokebox, as was the case with wood-burners of the period. It should be noted, however, that not all coal-burners used extended smoke-boxes. I have been unable to determine the date #119 was delivered at Omaha and put into service, but it could hardly have been there and in service before the early months of 1869.

The #119 and its sister locomotives all had a stovepipe or straight, capped stock smokestack, rather than the flared, bell-shaped and diamond stacks so common at the time for the wood-burners. All had the same driving wheel dimensions and cylinder and piston capacities. The vital statistics for #119 and its sister locomotives are as follows:[15]

Driving Wheel Diameter	Cylinder Diameter	Piston Stroke	Weight
54-inches	16-inches	24-inches	54,000 lbs. (engine only)

15. The dimensions of the #119 driving wheels are with steel tires on the iron wheel center. The tires add about 3 inches to a wheel (center) as cast for a locomotive of the 1860's. Sometimes dimensions of driving wheels are given as center, and this means without the tires added. The tires for locomotives were made of steel and shrunk on the centers much as an iron tire is put on a wood wagon wheel.

I have found no record of the history of #119 after it was put into service other than what can be gleaned from a few photographs and from the Union Pacific List of Locomotives. The photographs show the #119 in service in western Wyoming and Utah. It is not entirely clear how many of these photographs were taken prior to the Promontory Summit ceremonies of May 10, 1869. Since #119 was a bituminous coal burning engine it is logical to assume that upon arriving at Omaha, probably early in 1869 as indicated above, it was sent immediately to the western end of the track to use the coal available along the right-of-way in western Wyoming. The photographic record of the ceremonies at Promontory on May 10, 1869 show clearly that #119 was the engine used to draw the Union Pacific train to the ceremonies, and that it faced Central Pacific #60 in the joining of the rails ceremony.

After the May 10 historic meeting of the locomotives at Promontory the #119 apparently went back to the routine work of a locomotive on a railroad.

Union Pacific #119 was rebuilt in the early 1880's and in the general renumbering of 1885 it became #343. The Historical Record List of locomotives at Union Pacific headquarters in Omaha indicates

that it was broken up and disposed of as scrap in April 1903. The initials "B.U.", standing for "broken up", tell its fate.[16]

None of the sister locomotives of #119 survived it~~, you see~~. Two of them had been rebuilt in 1883 and 1884 with 68 inch driving wheels, but they lasted only until 1902.

Construction Drawings for Union Pacific #119

So far as I have been able to determine there are no construction drawings in existence for #119. The Union Pacific Railroad has stated that it does not have them.[17] The successor companies to The Rogers Locomotive and Machine Works apparently have not retained any of the early drawings that may once have existed for their 19th century locomotives. Drawings have not been found in any of the institutional

16. The writer examined this record in Omaha, together with subsequently dated official and unofficial data on U.P. locomotives in Union Pacific Railroad files. The Locomotive Historical Record List shows that the first Rogers built locomotives the Union Pacific purchased were #28-32, in 1867. They were all 4-4-0 engines weighing 54,000 pounds for "engines only." The same list gives the weight of #116-120 as the same, 54,000 pounds for the engines only. The U.P. Historical Record gives the weight of #119 rebuilt as #343 as 65,970 pounds in 1885, ~~but does not indicate whether it was for engine alone.~~ Often one will see the weight given for a locomotive without an indication of whether it includes the weight of the tender. The early practice generally was to give the weight of the engine without the tender. Later the practice veered to include the weight of the tender with that of the engine. A tender of the period would weigh about 20,000 pounds empty, and about 40,000 pounds loaded. The tender for #119 had a water tank capacity of either 2,000 or 2,200 gallons. I have been unable to determine which is correct.

17. Ltr, Edd H. Bailey, President, Union Pacific Railroad Company, to Representative David S. King, September 20, 1965, copy in files of National Park Service.

or private collections of railroad history, nor have any of the collectors or experts in railroad history I have consulted had any knowledge of the existence of such drawings. Only one set of drawings of a Rogers locomotive of the period has been found--and this in a work published in England. It will be described later.

But first it will be in order here to record briefly the history of the Rogers Locomotive and Machine Works to the present so that this report will reflect in a summary way the kind of effort that has been made to find drawings of #119.

The library of the Association of American Railroads in Washington and the Engineering Societies Library in New York City have a number of catalogues and histories of the Rogers Locomotive Works published by the company itself. These taken together give a good record of the company from its inception in 1831 in Paterson, New Jersey, until it was merged in 1904 with the American Locomotive Company. The American Locomotive Company had been formed in 1901 by merger of eight companies (2 more added later), including the Schenectady Locomotive Works. After the mergers the main offices and largest manufacturing facilities of the American Locomotive Company were centered at Schenectady, New York.[18] The company has in recent years given way to a new corporate firm, ALCO Products Inc., with operating and manufacturing headquarters at Schenectady but general offices

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18. See next page.

in New York City. Inquiries directed to both places have failed thus far to obtain answers to questions about the location or disposal of the early records relating to its subordinate companies, Rogers which manufactured #119 or Schenectady which manufactured Jupiter. It is of interest that both companies involved in our study eventually became part of the American Locomotive Company and now of ALCO Products.

The 1886 edition of the Rogers Locomotive Works catalogue and history indicates that Figure 117 seems to be the stack, design in 1864, that #119 carried. The drawings for cylinders on page 51 gives their arrangement; Figures 143-144 show the

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18. Rogers catalogues of 1893 and 1897 may be found in the library of the Association of American Railroads. A copy of Locomotives and Locomotive Building: Origin and Growth of the Rogers Locomotive and Machine Works, Paterson, New Jersey, From 1831 to 1876, (published by Rogers), New York, J.W. Pratt, Printer, 1876, may be found in the Engineering Societies Library, 345 East 47th Street, New York City. The Library of the American Association of Railroads has the same work updated and reprinted in 1886, New York, Wm. S. Gottsberger, Printer. This work and the Rogers catalogues gives numerous drawings and describe the principle advances and changes made in design of locomotives throughout the period and the reasons for them.

Of interest also are a number of articles in Railway and Locomotive Historical Association Bulletins. See Bulletin No. 10, 1926, 22-25, for an article by Walter A. Lucas; Bulletin No. 11, 1926, 22-23, has an article on the Rogers work from 1832 to 1904. The Bulletins of the Railway and Locomotive Historical Association, starting with No. 1 in 1921, have a wealth of information on various aspects of American railroading.

The 1876 edition of the Rogers history and factory catalogue indicates that Rogers locomotives carried a steam pressure of 130 pounds per square inch, cutting off at 50% and 70% of piston stroke. It also gives specifications of passenger and freight locomotives and general design on pages 49-53.

smokebox arrangement; and Figures 179 and 182-186 show spring and equalizing levers for the Standard American locomotive (pages 61-63).

In 1868 (the year of manufacture for #119) Rogers delivered 31 4-4-0 locomotives with 16-inch cylinders, the same size as #119. The next most popular model is reflected in 14 18-inch cylinder engines. Altogether, it built 70 locomotives in 1868 (Table, p.77).

The age of the steam locomotive came to an end about 1950 with the general acceptance of the diesel-electric. Nearly all the older locomotive companies have disposed of or destroyed drawings, photographs, and most of their detailed records of the steam locomotives they had built in the previous century. For instance, Baldwin (presently the Baldwin-Lima-Hamilton Corporation of Philadelphia) disposed of its older steam locomotive drawings about 1956.[19]

ALCO Products disposed of at least some of its remaining historical records of old steam locomotives in 1958. In May of that year the Historical Center of the City of Schenectady received from the company all the glass negatives of photographs of locomotives shipped between approximately 1880 and 1920 from the independent companies that had been merged after 1901 into the

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19. Ltr., Perry A. White, President, Baldwin-Lima-Hamilton Corporation, to Roy E. Appleman, February 22, 1966 (with enclosure from J. C. MacInnes to White, February 16, 1966)

American Locomotive Company, except for the Montreal works. These were identified according to builder's lists and indexed by the History Center. ¶ The announcement sent out by the History Center stated that builder's lists for the 10 companies merged into American Locomotive (Brooks, Rhode Island, Pittsburgh, Schenectady, Cooke, Rogers, Montreal, Dickson, Manchester, and Richmond) totalled 345 pages.[20] According to a statement from the City Historian, however, the records received included some 7,000 negatives, about 90% of which are on glass and date between 1885 and 1920. About 10% are on film and date between 1920 and 1947. ALCO Products apparently considered the latter year as marking the end of the age of steam locomotive. There were no line drawings or specifications for locomotives in the collection, according to the City Historian. Of immediate concern for our study were the builder's lists. Of these, the Rogers list in the History Center collection started in 1872, that for Schenectady in 1851.[21] Accordingly, there was no reference in the collection to Rogers built Union Pacific #119.

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20. The writer found a copy of this announcement from the Office of the City Historian, City of Schenectady, New York, dated December 23, 1959, in the library files of the Simmons-Boardman Publishing Company, Room 1622, 30 Church Street, New York, through the courtesy and help of Miss Edith Stone, Librarian. The Simmons-Boardman Publishing Company has a large and extensive library and file on railroad history, and Miss Stone is an unusually well informed person on the subject. The Company and its predecessors have been publishers of railroad journals, magazines, and books for nearly a century.

21. Ltrs., J.W. Joyce, Historian, City of Schenectady, N.Y., to Roy E. Appleman, March 23 and April 13, 1966.

With this information in hand, and with no cooperation to this date from ALCO Products, Inc., it appears that there are no construction drawings and specifications for the #119 to be had from the company, or its corporate successors, that manufactured it.

In the light of the information obtained during the course of this study, it appears that most if not all the locomotive manufacturing concerns have disposed of most of their records for the 4-4-0 early steam locomotives, and, further, that about 10-20 years ago with the advent of the diesel-electric locomotive and the obsolescence of the steam locomotives nearly all detailed drawings and specifications for steam engines were disposed of.

There is the possibility that working drawings for the #119 as much never existed, since in the 1860's methods of manufacture apparently did not always require complete drawings. Basic drawings and patterns were followed for a given model and machinists probably did not need or use new detailed drawings for all parts when orders for standard locomotives were received. ~~be in the practice today in machinery design and manufacture.~~

Colburn Drawings of Rogers Locomotive

But if there are no existing drawings of the #119, we have available drawings that are close to it and can serve as basic for production drawings of the locomotive. Strangely, this set of drawings appears in a British publication, in 1871, and consist of three plates 30½ by 13 inches in size, drawn to a scale of $\frac{1}{4}$ inches to 9 feet. These three plates may be described as engineering assembly drawings. Colburn was a native of the United States who became editor of the Engineer, published in London, and resided in Great Britain for many years.

Plate XVIII presents a ~~pictorial~~ side elevation view of the locomotive in profile ~~of a~~ from the right side ~~view~~. Plate XIX presents the same view in a longitudinal cross section ~~showing terms of~~ showing working parts and exposed boiler tubes. Plate XX consists of a series of 10 separate drawings of details, such as view of cab from foot plate, section through cylinder, half section through fire box, front view of locomotive, two sections of Bissell truck, half plan of Bissell truck, piston, plan of cylinder and valve motion, section through guide bars, and section through cylinder and valve motion. The scale for Plate XX, details, is different from the scale for the other two plates, being 3 3/4 inches to 5 feet.

This set of drawings, published in 1871 and dating obviously from that year or earlier is precisely what the #119 would have been in 1868 except for the size of driving wheel, smoke box, and fire grates. These drawings are for a wood burning passenger locomotive, as is indicated by the rocking grates and combustion chamber. ~~Accordingly~~, they do not have the extended smoke box that #119 had, and the smokestack is a modified diamond stack instead of the stovepipe variety on #119. The driving wheels appear to be 68-inch diameter. These are features that can rather readily be adjusted in final drawings based on the Colburn plates. Otherwise the Colburn plates represent the Union Pacific Rogers-built #119. The essential parts are drawn and the assembly shown.[22]

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22. See next page.

These plates, together with the photographs of #119 that have been assembled, will serve as a sufficient body of authentic source material from which accurate construction drawings can be made, and from which the #119 replica can be manufactured. A set of black line photostatic positive prints of the Colburn plates is included as Appendix A.

Weissenborn Drawings

Of interest in this connection and possibly of some use in preparing the final drawings for #119, mention should be made of other drawings, chief of which is the unique set of construction

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22. Zerah Colburn, Locomotive Engineering, and the Mechanism of Railways: A Treatise on the Principles and Construction of the Locomotive Engine, Railway Carriages, and Railway Plant, with Examples (64 large engravings and 240 woodcuts), 2 vols., London & Glasgow, William Collins, Sons, & Co., 1871. Volume 1 contains text, volume 2 contains the plates. This set is unique in that most of the discussion and plates relate to English manufactured locomotives and rolling stock, with several models of French equipment also featured. There is only one American locomotive illustrated in the work, and it happens to be the Rogers passenger locomotive of the period of our interest. In this we are fortunate. Colburn gives the vital statistics of the Rogers 4-4-0 illustrated in Plates XVIII, XIX, and XX as follows:

Area of Grate	13 square feet
Heating Surface	787 square feet
Diameter of Cylinders	16 inches
Length of Stroke	24 inches
Diameter of Driving Wheels	5 feet 8 inches
Length of Wheel Base (extreme)	20 feet 1½ inches
Length of Wheel Base to center of Bogie	23 feet
Length of Bogie alone	5 feet 9 inches

(Pages 266-267)

drawings in G. Weissenborn's large folio size two volumes on railroad locomotive and car drafting. This work was published in 1872, with the construction drawings in volume 2 carrying the notation, "entered according to the Act of Congress in the year 1871..." The drawings do not represent either a Rogers or a Schenectady locomotive, but are of Danforth, Baldwin, Hinkley, Grant, and New Jersey Locomotive and Transportation Company, (it replaced the N.J. Loc. & Transpt. Loc. in 1867) and others, together with drawings of tenders and cars. Most of these drawings have features common to both the #119 and Jupiter.

The set of drawings most complete of all and very close to the Jupiter, but somewhat less so for #119, is that for New Jersey Locomotive and Transportation Company wood burning passenger locomotive #44. The drawings are in nine plates altogether, with 4 giving elevations, valve and link motions, half sections, longitudinal sections, and 5 plates incorporating a large number of detailed figures of parts. They are sufficiently complete so that for practical purposes they may be called construction drawings.

The New Jersey Locomotive and Transportation Company locomotive #44 is similar in vital statistics to the #119 and Jupiter, except that the length of the piston stroke is 22 inches instead of 24 inches. It may be considered a basic source for study and design of details. I have found no other set of construction drawings for the 1868 period 4-4-0 locomotive, nor do any of the experts in the field I have consulted know of another or of anything comparable

to it. I first found the Weissenborn work in the Engineering Societies Library in New York City,[23] A set of the Weissenborn plates for New Jersey Locomotive and Transportation Company locomotive #44 ~~1/8~~ constitutes Appendix B, together with certain other locomotive plates from the Weissenborn work and four plates showing construction details of a standard tender that would be suitable for #119 and Jupiter, if modified for certain details that show in photographs of their tenders.

Brief mention will be made here of other scaled drawings, diagrams, and pictorial sketches of a Standard American locomotive of the period that may be of some reference value in preparing the

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23. G. Weissenborn, American Locomotive Engineering and Railway Mechanism, With a Practical Treatise on the Draughting, Construction and Principles of the Locomotive Engine and Railway Cars; Illustrated with Large and Detailed Engravings..., 2 vols., 269 Pearl Street, New York, American Industrial Publishing Co.,1872. Weissenborn was a mechanical engineer. This work is unique in that there appears to be none other like it with the same degree of scaled detailed drawings of early American locomotives.

According to Mr. John A. White, Jr., Chief, Land Transportation Division, National Museum, Smithsonian Institution, these drawings can be used as a basic reference for both Jupiter, which was a woodburner, and for #119 a bituminous coal burner, since there would be no differences except for the extended smokebox, and a somewhat different firebox and grate. The firebox and grate would not be greatly different in a bituminous coal burner from those in a standard wood-burner, but in an anthracite coal burner they would be much larger.

The Weissenborn work is considered a rare and valuable set by railroad buffs, and commands a high price. The Library of Congress has volume 2, but not volume 1, and some of the plates in its volume 2 have been removed or the copy was initally imperfect. The Library of the Association of American Railroads has volume 1 of the text, but not volume 2 of plates. The Smithsonian Institution has a near perfect set of the work, and it is from this copy that the copies of the Weissenborn drawings in this report were obtained through the courtesy of Mr. John A. White, Jr., of the Smithsonian staff.

final drawings for #119 and Jupiter, although it is my opinion that they probably will add little or nothing to the Colburn and Weissenborn plates included in Appendices A and B. The Railroad Gazette for December 23, 1871 carries a scaled profile drawing of a Baldwin 4-4-0, at ½ inch to 1 foot, 16 x 24 cylinder and stroke, 60 3/4-inch driving wheels, weight 65,000 pounds.

The Railroad Gazette for May 10, 1873 carries drawings of a Grant locomotive, and in its issue of April 13, 1877 it has a drawing of a New York Central and Hudson River Railroad, Standard 4-4-0 together with railroad specifications. In 1883 the Railroad Gazette Publishing Company published a volume entitled Recent Locomotives, which brought together a number of scaled drawings giving pictorial and profile characteristics of several Standard American 4-4-0 locomotives of the 1870's period. Some of these plates were reproduced in Graham Hardy & Paul Darrell, American Locomotives, 1871-1881, published at Oakland, California in 1950. This volume also includes certain drawings taken from Mathew N. Forney, Catechism of the Locomotive, 1873. Forney's book appeared in numerous reprints and editions in the later half of the 19th century and was generally regarded as the "bible" for a study of the steam locomotive. Some of the later editions contain numerous valuable drawings of locomotive parts. The 1875 edition is one of these, including even a drawing of a railroad water tank

drawnnto scale (Figure 225); a Y turn-around (Figure 229); and a 4-4-0 locomotive and a turntable drawn to scale (Figure 227).[24]

Some of these drawings, including one with a glossary of parts keyed to a Grant Standard American locomotive and tender, are included in Appendix C. These may be listed as follows:

1. Grant Locomotive, Plate VI, scale 1/8 inch to 1 foot, table of dimensions and weight.
2. Grant Locomotive, Figures 4, A-5, A-6, A-7, A-8, A-9, A-10, in various scales shown on drawings. These drawings include longgitudinal section, plan, and boiler. Figures A-8 and A-9 give a list of parts with reference to drawings.
3. American Locomotive, New York Central & Hudson River Railroad, Figures 9,10,11,12,13,14,15,16,17 (15-17 of tender).
4. Meaured drawing of Baldwin Locomotive #11, 1872, Virginia & Truckee Railroad.

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24. Mathew N. Forney, Catechism of the Locomotive, Railroad Gazette Publishing Company, 73 Broadway, New York, 1875, 451, 456-457.

Specifications--Rogers Built Union Pacific #119

Accompanying construction drawings for a locomotive there normally would be a set of specifications describing materials to be used and containing certain other instructions. In the case of #119 no extant specifications have been found, just as there are no construction drawings. But fortunately there is a sheet of specifications for a Rogers 4-4-0 built in 1867, just a year earlier than the #119, and undoubtedly very nearly identical to the specifications for #119. For practical purposes in reconstructing a replica of #119 it is believed the specification sheet for the Rogers built Seminole will be valuable. This is the only specification sheet for any 4-4-0 locomotive of the period found in the course of preparing this study.

The Seminole: The Seminole was a 4-4-0 Standard American locomotive built by Rogers for the Union Pacific Railroad in 1867, #21. It was the last of the Union Pacific locomotives to be given a name. The Rogers factory list of locomotives indicates that it was completed on April 10, 1867.[25] Photographs show that it resembled the #119 in characteristics except that it has a flared bell-shaped or "Bonnel" smoke stack instead of the stove-pipe stack of #119, and was a wood-burner. It was eventually renumbered and was

NO! IT WAS BUILT FOR THE UNION PACIFIC RAILWAY, EASTERN DIVISION, WHICH BECAME THE KANSAS PACIFIC

25. Rogers Factory List of Locomotives, copy in possession of John A. White, Jr., National Museum, Smithsonian Institution.

transferred to the Kansas Pacific Railroad, a subsidiary of the Union Pacific.

In 1952 Alfred W. Bruce's book, The Steam Locomotive in America: Its Development in the Twentieth Century, was published. Bruce had been chief engineer of the American Locomotive Company, and in the nature of his position he had become familiar with the records of the original companies that had merged in the American Locomotive Company. At some point he had come upon the manuscript specification sheet for the Seminole. He used it as an illustration in his book. The Rogers Company apparently printed up specification sheets with a listing of all the special features and parts of a locomotive, providing space for writing in additional information as to materials and special instructions applying to the locomotive in question.

The Seminole sheet shows this, and even includes some rough pen and ink sketches to illustrate a point. The specification sheet in the size reproduced is hard to read in places, but this can be done with the aid of a magnifying glass. It shows, for example, that the driving wheels were 54 inches, the same as #119; that the bell frame was scroll, the same as #119; that the cab was of walnut and the seat of ash; the cylinders were 16-inch diameter but the piston stroke 22 inches instead of the 24 inches for #119; the pilot was of wood; that lettering was to be gold with black shade; and many other similar details.[26]

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26. See next page.

Although Mr. Bruce devotes the greater part of his book to locomotives after 1900, he includes an interesting chapter on the early development of the steam locomotive. Fortunately, in this he features the Seminole. Because of his own eminence as a locomotive railroad engineer, Mr. Bruce's comments about the Seminole specifications, and how much is left to the craftsmen and not detailed in specifications, are worth noting as this practice undoubtedly was of general application in the period and would relate to #119 and the Jupiter. On this point he says:

> "The specification makes no mention of the methods to be followed for the construction of the boiler or for the machining of the detail parts and their assembly, all of which are apparently left to the judgment and facilities of the locomotive builder. With but few exceptions, no mention is made of the material to be used for the important elements. However, since only brass, copper, and cast and wrought iron were then commercially available, this is not surprising, for early in the industry definite grades of material were recognized as being applicable to the different details."[27]

In another place, Bruce comments that, "As the art of reproducing drawings was undeveloped at the time, detail information on these old engines is often very limited." The "Main Drawing" and "Section

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26. Alfred W. Bruce, The Steam Locomotive in America: Its Development in the Twentieth Century, W. W. Norton & Company, Inc. New York, 1952, Figure 3, 40, reproduces specifications for the Seminole. Mr. Bruce is now dead and it might be hard to trace what happened to the original used in 1952, it probably is in existence.

27. Bruce, 41.

entries written in longhand in the blank space under the heading "DRAWINGS" indicates that there were generalized drawings that would do for basic needs in the manufacture of most of the locomotives of a given model, and that these would be consulted as needed. A copy of the Seminole specifications is included in this report.

The Seminole specifications, taken together with the Colburn plates and photographs of #119 and other locomotives of the time, are valuable basic information on the Rogers 4-4-0 locomotives of the period.

There is still another document, a form of description that falls short of being a specification for a Standard American 4-4-0 locomotive of the period, that will be useful. It describes parts and materials but is not a specification sheet as was that for the Seminole. This appeared in a book published by the Grant Locomotive Works, also of Paterson, New Jersey, in 1871, entitled, A Description of Locomotives Manufactured by the Grant Locomotive Works of Paterson, New Jersey, published by James Sutton & Company of New York.[28]

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28. A copy of this valuable work is in the Library of the American Association of Railroads. It contains unusually clear photographs of the principal mechanical parts of a locomotive, including even a lighted view of the boiler tubes arrangement. The frontispiece is a drawing of the Grant built Standard American 4-4-0 locomotive "America." which won a gold medal at the Paris World Exposition in 1867.

A copy of the Grant "Description," as it appeared in the 1871 book, is included as Appendix D. The Railroad Gazette for May 27, 1871, editorialized about the specifications and reprinted them as being of unusual interest.[29]

There is another set of descriptions that support those already cited. These are for a Standard American 4-4-0 Baldwin built locomotive, 16x24 cylinders, the same as for both Jupiter and #119. A copy of these descriptions is also included as a part of Appendix D. A scaled drawing of the locomotive "Philadelphia" to which the specifications relate is also included.[30]

A comment is in order here about two or three works that have unusual reference value on many details of early 4-4-0 locomotives, and which should be consulted as needed. These are listed in footnote 31.

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29. Railroad Gazette, May 27, 1871, 101, 107-108.

30. Railroad Gazette, December 23, 1871. Drawings face page 399, specifications on pages 399-400. Issue of December 30, 1871 carries engraving of one half of front end and a half section about center of the engine. The Hardy and Darrell volume on American Locomotives 1871-1881 reproduces these drawings and descriptions, but they are not as clear as the original drawings in the Gazette.

31. See next page.

31. The various editions of M.N. Forney's Catechism of the Locomotive; also Locomotives and Locomotive Building, Being A Brief Sketch of the Growth of the Railroad System and of the Various Improvements in Locomotive Building in America Together with a History of the Origin and Growth of the Rogers Locomotive and Machine Works, Paterson, New Jersey, From 1831 to 1886, New York, Wm. S. Gottesberger, Printer, 11 Murray Street, 1886. The Preface by M.N. Forney indicates that he wrote the work at the request of the officers of the Rogers Locomotive Works, and that the company provided the materials from its records to illustrate the work at least as far as it relates to the Rogers Company. Mr. Forney's standing gives this work an authoritative value. It is richly illustrated with clear line drawings and engravings of the Standard American locomotive and its principal parts as it had developed down to 1886.

Two other volumes that are of value for all kinds of technical matters relating to the early locomotive are the following: Zerah Colburn, The Locomotive Engine, Philadelphia, Henry Cary Baird, 1872; and the American Locomotive Company's Locomotive Handbook, 30 Church Street, New York, 1917, which includes a brief sketch of the organization of the company and its history.

(originally written in 1851 but reprinted for many years even after it became out-of-date)

Photographs of Union Pacific #119

As evidence pertinent to preparing construction drawings of both the Jupiter and #119, an effort has been made to assemble copies of as many photographs as possible of these two locomotives before they were altered from their original condition by rebuilding. Most of the existing photographs were taken in connection with the joining of the rails ceremony at Promontory Summit, Utah on May 10, 1869. A few were taken a day or two before the ceremony or at some later date.

There were three photographers present at the Golden Spike ceremonies on May 10, 1869 and in the two or three days preceeding the ceremony. They were the following:[32]

Andrew Joseph Russell, of New York City, serving as official photographer for the Union Pacific Railroad.

Alfred A. Hart, of Sacramento, California, serving as official photographer for the Central Pacific Railroad.

Charles R. Savage, of Salt Lake City, apparently acting as a free-lance or independent photographer.

Of the three, it is now established that A. J. Russell took the most famous and best pictures of the ceremony. Several of these include views of #119. A few of Russell's pictures have been reproduced many times without any identification as to who took them, and if

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32. Hugh F. O'Neil, "List of Persons Present, Promontory, Utah, May 10, 1869," Utah Historical Quarterly, Vol. 24, 1956, 157-164. I have seen no stereo views of the Golden Spike ceremony other than those attributed on the printed stereo cards to Russell, Hart, or Savage & Ottinger.

identified have been wrongly identified as being the work of Savage. The evidence has recently come to light that sets this matter straight. The photographs assembled as a part of this report will identify each one, where it has been possible for me to do so, as to photographer and the date or approximate date taken. Some photographs will be clear as to certain details of the locomotive in questions, still others will bring out additional details hidden, obscured, or missing in the first. Study of all of them will permit the draftsman preparing the construction drawings to reflect the actual appearance of details which might not be possible from any other of the basic materials he will use as sources.

All photographs of sister locomotives of #119, those made at or nearly at the same time by the same manufacturer and to the same specifications, are included. They show just as well as photographs of the #119 itself what the locomotive looked like, since they were identical in characteristics and features.

A. J. Russell emerges as the most important photographer of the Promontory Summit Golden Spike ceremonies of May 10, 1869 and of the locomotive there. The largest known surviving collection of original negatives, glass wet-plates, of the building of the first trans-continental railroad is of his negatives. This collection, known as the Combes Collection, is in the American Geographical Society, in New York City. There are 237 numbered negatives (a few missing) and 2 un-numbered negatives in the collection. They represent views

taken by Russell in 1869 in the course of a journey over the Union Pacific Railroad from Omaha to Promontory Summit, and three or four views taken west of there on the Central Pacific, including one of the Central Pacific terminus and machine shops in Sacramento. All negatives are 10x13 inches in size.[33] Seven views relate to the Golden Spike ceremonies and were taken on either May 9 or 10. Prints are included in the photographic section of this report.

Russell had served as a captain of infantry in the Union Army during the Civil War, spending much of his time as a photographer with the Military Railroads construction corps. It was this experience, undoubtedly known to General Grenville Dodge, Chief Engineer for the Union Pacific Railroad, that must have played an important role in his work for the Union Pacific Railroad in 1869. Russell had established himself in New York as a photographer at least as early as the first half of 1868, and he apparently made the trip west in 1869 from there. He carried a stereoscopic view camera as well as the large 10x13-inch camera.[34] The quality of Russell's work is unexcelled by any contemporary photographer; his landscape views are superb.

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33. Ltr., Charles B. Hitchcock, Director American Geographical Society (Broadway at 156th Street, New York, N.Y. 10032), to Roy E. Appleman, May 25, 1966, together with list of Russell negatives.

34. William D. Pattison, "The Pacific Railroad Rediscovered," Geographical Review, Vol. 52, No. 1, 1962, 25-36. This is a most interesting and valuable article in reference to the Russell photos. Pattison's study has been the means of correcting long-standing errors in attributing to others the fine work of Russell at Promontory Summit. Pattison is Assistant Professor of Geography at the University of California, Los Angeles.

It has been my experience in the course of examining several hundred, perhaps a few thousands, of railroad and locomotive pictures of the 1860's-1870's period in a number of institutions, historical societies, and libraries to find that only a very few are identified as to who took the photograph, the date taken, and frequently a meaningful identification of the scene. This is true even of the collections in the Union Pacific and Central Pacific Railroads. Often pictures are wrongly identified. I have learned that one of the best ways of identifying a picture is to find it in a stereoscopic view. In the period of the Golden Spike events, the principle commercial outlet for photographic work was to make and sell sets of stereo views on a given subject. It was for most persons at that time the only substitute within their means of taking a trip to far off lands and enjoying novel and strange scenes. Many of the photographs in this report were copied from stereo views I found at various places. In each such instance the source is given in the identification. The largest stereo collections I have seen is a Russell collection at the Union Pacific Historical Museum in Omaha, and a collection of Hart's at Stanford University Library.[35] Among the better known photographers of the period, in addition to A.J. Russell, who took many stereo views were Alfred A. Hart of Sacramento,

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35. Pattison indicates that the American Geographical Society has more than 400 stereo negatives taken by Union Pacific Railroad photographers, but only a few prints made from these negatives. See above cited article.

The following of interest also concerning stereosocpic views of the railroad is William D. Pattison, "Westward by Rail with Professor Sedgwick: A Lantern Journey of 1873," Historical Society of Southern California, XLII, No. 4, December 1960.

Charles R. Savage of Salt Lake City, E. J. Muybridge of San Francisco, W. H. Jackson of Omaha, and John Carbutt of Chicago.

Mention should be made of drawings such as those of Arthur R. Waud that appeared as wood cuts or engravings in the popular magazines of the time, such as Harpers Weekly and Frank Leslie's Weekly. There were several of these that related to the subject of our study, but they do not have the same value as source materials as do photographs.

It may be well to insert a word of caution about the use of photographs of locomotives used in recent years to represent both Jupiter and #119 in the various railroad fairs that have been popular. An example is the Chicago Railroad Fair of 1948-1949. In the railroad equipment exhibit there were two locomotives painted and otherwise slightly modified to represent these two historic locomotives. Actually, the locomotive representing Jupiter was the Genoa from the Virginia & Truckee Railroad. The Genoa is a 4-4-0 Standard American locomotive built by Baldwin in 1872. Some features do not resemble the original locomotive it represented, yet these pictures, widely reproduced, are even now often presented as showing what the original locomotives looked like, and sometimes they are presented as actually being of the original. Likewise, Union Pacific #119 was represented by a rebuilt 1892 locomotive, #66, of the Hannibal & St. Joseph Railroad. One obvious discrepancy here was the absence of the

distinctive, fluted sandbox of the Rogers built locomotives; and the smokestack also was different. There were many other variations from the original locomotive represented that a knowing eye would quickly see.[36]

In 1939 Cecil B. DeMille made Paramount's movie "Union Pacific." In this movie two locomotives originally part of the motive power of the Virginia and Truckee Railroad in Nevada were used and modified superficially to look somewhat like the Jupiter and #119. The late Lucius Beebe was historical and railroad equipment consultant to Paramount in the making of this movie, which has some value in representing the building of the first transcontinental railroad. But neither of these two locomotives used in the movie are faithful to the originals they portray. They were early 4-4-0's, however, and are still owned by Paramount and in operable condition.[37]

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36. Chicago Railroad Fair Official Guide Book, 1949 (2d year, June 25-October 2, 1949) lists and illustrates some of the equipment on display there; Reed Kinert, Early American Steam Locomotives, First Seven Decades 1830-1900, Seattle, Superior Publishing Co., 1962, picture p. 123 of simulated #119 and p. 106 of simulated Jupiter.

37. Conversation with Gerald M. Best, May 3, 1966, in which we discussed this matter. Best knew Beebe well and worked himself for 40 years in the movie industry in Hollywood.

These two instances are mentioned to make the point that none of this material should be used in our work on Jupiter and #119. It is not reliable.[38]

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38. Two picture books that contain many photographic illustrations of Union Pacific and Central Pacific locomotives, including some of Jupiter and #119, not always corectly identified, are William Kratville and Harold E. Ranks, Motive Power of the Union Pacific, Omaha, Barnhart Press (copyright by Kratville and Ranks), 1960; and Lucius Beebe, The Central Pacific & the Southern Pacific Railroads, Berkeley, Howell-North Books, 1963.

CENTRAL PACIFIC #60, JUPITER

The early genius of the Central Pacific Railroad, building eastward from Sacramento, California ~~which was to a meeting point with the Union Pacific~~, was Theodore DeHowe Judah, a civil engineer from the east, whose father had been an Episcopalian clergyman in Troy, New York. It was Judah who determined the feasibility of the railroad line across the Sierras, laid it out and guided the early efforts to build it. However, as financiers and managers, the Big Four--Stanford, Huntington, Crocker, and Hopkins--soon controlled the enterprise. Judah died November 2, 1863, only a matter of weeks after the Central Pacific had received its first locomotive. Although the Central Pacific had broken ground at Sacramento on January 8, 1863, the first rails were spiked to ties on October 26, a week before Judah's death.

On October 4, 1863, Central Pacific locomotive #1 was unloaded at the Sacramento levee. It had been brought by schooner from San Francisco where it had arrived by ship from the east coast and around Cape Horn. It was named "Governor Stanford." All the locomotives of the Central Pacific for the first few years came in sailing ships around the Horn, most of them disassembled. Some came to the Isthmus of Panama and were there placed on flatcars, carried across the Isthmus, and reloaded on ships on the west side and

carried on to San Francisco. Central Pacific #1 was built in 1862, a 4-4-0 with 16x22-inch cylinders, and 54-inch driving wheels.[39]

From this beginning in October 1863, the Central Pacific gradually built up its locomotive motive power and rolling stock, but with rapid growth only in 1868 and 1869 as the track construction neared completion. By the time the railroad was completed in May 1869, the Central Pacific had 150 locomotives.[40] As 1869 began, 35 ships were bound for San Francisco from the east coast with railroad materials for the Central Pacific, including 18 locomotives.[41] The cost of the Governor Stanford had been $13,688.86, including shipping and insurance. The freight charges on a locomotive shipped around Cape Horn averaged about $2,000 or more. There is a record of freight charge for one locomotive across the Isthmus of Panama of $8,100, although the average cost would be a little more than half that. A locomotive delivered at Sacramento might cost in the ~~neighborhood of~~ close to $20,000,[42] although the factory cost would be in the neighborhood of $10,000,

39. Griswold, 20,39; Central Pacific Railroad Company List of Locomotives, Stanford University Library.

40. American Railroad Journal, XXV, No. 23, June 5, 1869, 617. It also had 1,400 platform cars, 360 boxcars, and 17 mail and baggage cars.

41. Griswold, 296.

42. John Debo Galloway, The First Transcontinental Railroad, 1950, 141; Griswold, 83; Lucius Beebe, The Central Pacific and Southern Pacific Railroads, Berkeley, 1963, 21.

Central Pacific #60, named Jupiter, apparently arrived at Sacramento in early 1869, possibly January or February, after the sailing ship journey around Cape Horn. The engine was built by the Schenectady Locomotive Works, Schenectady, New York, as one of an order for 4 locomotives. The Schenectady Locomotive Order Book under the date of January 10, 1868, carries work order No. 505 for the Central Pacific R.R. Co. of California for delivery "22 c August 1868 JUPITER No. 60" and describes it as an "eight-wheeled Engine, Cylinder 16in x 24in Four Driving Wheels Coup. c 5ft. diam."[43]

The late David L. Joslyn, a long-time employee of the Southern Pacific Railroad which was corporate successor to the Central Pacific, and a respected student of the history of the Southern Pacific and Central Pacific Railroads, published a list of "The Old Iron Horses of the Central Pacific," in 1924 in which he indicates that #60 or Jupiter was in service in July 1868.[44] This table has been reprinted in numerous places and in some recent books, but it is in error as to the date of service for the Jupiter.

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43. Ltr., J.W. Joyce, Historian, Schenectady City History Center, to Roy E. Appleman, March 23, 1966, quoting Order book in History Center. This Schenectady Order Book had been deposited in the History Center, along with other railroad historical materials, in May 1958 by the American Locomotive Company.

44. See next page.

Mr. Best's copy of the Schenectady Locomotive Works engine list gives September 1868 as the date Jupiter was finished at the factory. Best is inclined to believe that #60, Jupiter arrived at Sacramento in February 1869. But I learned in conversation with him that he really has no firm information on this point.[45] In any event, the time required to tow the engine to Boston or New York for loading on an ocean going sailing ship, the trip around the Horn to San Francisco, unloading there, reloading on a river schooner, the trip to Sacramento, and unloading there would take at least two or three months. It is my conclusion, even though there is no documentary evidence at hand as to the date the locomotive arrived at Sacramento, that it probably was in January or February 1869. This would suggest that the Jupiter had been in service perhaps not more than 4 months when it participated in the Promontory Summit ceremonies on May 10, 1869--virtually a new locomotive.

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44. Railway and Locomotive Historical Society Bulletin No. 7, 1924, 59-61. Gerald M. Best and Fred A. Stindt, both long students of Central Pacific and Southern Pacific historical materials, feel that Joslyn often made the mistake of giving ~~as the date~~ the date a locomotive was completed at the factory as the date it was in service.

I made an effort in the limited time at my disposal to learn, if possible, from the Sacramento Daily Bee, the date the Jupiter might have arrived at Sacramento, but failed to find any item concerning it, and for that matter I found no mention of the arrival of any locomotive, although it is known that many were arriving in the first part of 1869. The Central Pacific Locomotive List indicates that more than 100 locomotives were built for the company in the last 4 months of 1868.

45. Ltr., Gerald M. Best to Roy E. Appleman, March 16, 1966; Conversation, Appleman with Best, May 3, 1966.

Jupiter, Central Pacific #60, was a Standard American wood burning, 4-4-0 locomotive, having the following basic characteristics:

Diameter Driving Wheels	Diameter Cylinders	Piston Stroke	Weight
60-inches	16-inches	24-inches	65,450 pounds

It will be observed that the driving wheels of Jupiter were 6 inches greater in diameter than those of Union Pacific #119, and that the engine was considerably heavier. Otherwise, the two locomotives were basically similar in motive power and construction. The most obvious difference to the eye would be the straight, relatively slender or straight, capped stove-pipe stack of the #119 and the flared, "balloon" ~~bell-shaped~~ stack of the #60.

From the time it arrived at Sacramento, probably early in 1869, the Jupiter undoubtedly was engaged in passenger and freight work on the railroad between the Sacramento terminal and points in California and Nevada. I have found no specific information on its history prior to the Promontory Summit event. And that it was there seems to have been wholly a matter of accident. It was not picked initially as the locomotive to take Governor Stanford and his special party to the stage of history at Promontory.

The regular morning train eastbound left the Central Pacific terminal at Sacramento at 6 o'clock Thursday morning May 6, 1869, carrying its usual allotment of passengers, plus several persons

bound for Promontory Summit where the ceremony of joining the rails was scheduled to be held two days later, on Saturday May 8. Departing a few minutes after the regular train was Stanford's special train carrying the railroad's president and his party. They were bound for Promontory for the ceremony. I have found no contemporary record which names the locomotive pulling either train from Sacramento on May 6. One of the guests on Stanford's special train said it consisted of the locomotive, tender, and the "superintendent's" car. The latter had been fitted for sleeping quarters for 10 persons.

The late David Joslyn, ~~an employee of the Southern Pacific Railroad nearly all his working life and devoted to its history,~~ wrote an article in 1956, presumably based on Southern Pacific records, in which he states that the Antelope was the locomotive selected to pull Governor Stanford's special train from Sacramento. He goes on to say that "somewhere along the line the Antelope was knocked out by a blast that sent a pile of rocks over into her. The Jupiter was in the house at Truckee and was quickly fired up, and made the run up the hill to where the president's train was stilled. She helped to re-rail the Antelope, and then dragged her and the train to Truckee. From there on the Jupiter took the limelight."[46]

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46. David L. Joslyn, "Steam Locomotives of the Southern Pacific System," an annex in Gerald M Best and David L. Joslyn, "Locomotives of the Southern Pacific Company," Railway and Locomotive Historical Society Bulletin, No. 94, March 1956, 157.

Gerald M. Best has informed the writer that the late David L. Joslyn told here in 1956 that Patrick Sheedy, a famous C.P. master mechanic, had been at the Truckee roundhouse in 1869, and had told him about the Jupiter being taken from there to pull Stanford's train.

Sheedy died in 1924 and Joslyn is also dead. It is possible that the Jupiter was taken from Truckee to Wadsworth and there attached to the Stanford train. Ltr., Best to Appleman, Aug. 10, 1966.

This account may be correct as to the Antelope starting from Sacramento with the special train, but the account of what happened in the incident described is almost wholly wrong, except that there was a mishap to the special train. If the Antelope did indeed start with the Governor's party, then Central Pacific locomotive #29 (for that was its number), made by McKay & Addus in 1867, was cheated by fate from being a locomotive of history.[47]

The Jupiter entered upon the stage of history at Promontory. It may have been the locomotive that pulled the regular passenger train out of Sacramento on the morning of May 6. This certainly was the case unless the locomotive on the train was changed someplace between Sacramento and Promontory. On this point I have found no evidence, and lacking any to the contrary one may assume that the locomotive that pulled the train into Promontory was the one that started with it from Sacramento.

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47. The Central Pacific Locomotive List carries the Antelope as #29. It was a 4-4-0 and, like the Jupiter, had 60-inch driving wheels and 16x24-inch cylinders. It weighed 62,100 pounds. Copy of list in writer's possession. I found a blue print copy of the Central Pacific Locomotives List revised and brought down to date from the beginning of the railroad to 1925, in an unclassified drawer of railroad material in the vault of Stanford University Library. This list was in a heterogeneous pile of loose materials of various descriptions and apparently the Library was unaware it had this valuable record. I brought it to the attention of the librarian with the recommendation that it be bound, classified, and held as a rare document. This list was prepared by David L. Joslyn in 1924, according to Gerald M. Best. A more complete record may be found in Railway and Locomotive Historical Society Bulletin, No. 94, March 1956, cited previously. Ltr., Gerald M. Best to Roy E. Appleman, August 10, 1966.

Now to follow the story of Stanford's special train from Sacramento. Fortunately, there are at hand two contemporary accounts, and there may be more that I have not seen, that agree as to the main incidents. On the special train as one of the guests invited by Stanford was Dr. J. D. B. Stillman, who had come to California by Ship with Mark Hopkins in 1849, and in 1869 was city coroner of San Francisco. In the July 1869 issue of The Overland Monthly he published an account of the trip to Promontory taken just a few weeks before. In it he describes the accident that befell the special train and came near being a tragedy for the party. I quote from this article:[48]

> Down the valley of the Truckee River winds the great highway, crossing the river several times. Just before entering a tunnel, when the road slips in between the mountain and the river, we came near driving our last spike. Some Chinamen on the mountain side were cutting trees, and seeing the regular train pass, and knowing nothing of a special one, they probably thought it a fit time to run a log down the mountain. But whatever may have been their intention, the log landed on the railroad just before us--its length fifty feet and its greatest diameter three and a half feet--the smaller end rested on the track midway between the rails, and the other rested on the

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48. J. D. B. Stillman, "The Last Tie," The Overland Monthly, July 1869, 77-84.

bank at an angle of about forty-five degrees. The short turns of the road prevented the threatening danger from being discovered until we were almost upon it; but the promptness of the engineer, and the lightness of the train, saved us from a catastrophe. The pilot picked up the log, or did its best to do it, and went through bankruptcy; but the force of the blow was not lost, for the heavy frame of the engine tripped the log and landed it where there was just room for it, yet did not prevent it from clearing away the steps of the starboard side of the train from stem to stern. The only person injured--and he but slightly--was one of our party who was on the engine, who, seeing what seemed an inevitable crash, jumped from the train. The force of the blow can be conceived from the fact that the log was broken through the middle, where it was at least three feet in diameter.

It was near sundown when we reached the last crossing of the Truckee, where our crippled locomotive was sent into the hospital, and our cars were made fast to the regular train. Here the desert proper begins;...

One of the men who made the trip to Promontory to report on the ceremonies was a correspondent of the Sacramento Daily Bee. He was a passenger in the train that left Sacramento the morning following the departure of Stanford's special. During the trip to Promontory

he sent back a number of dispatches describing the trip. One of these, headed "Truckee," and dated at Elko, May 7, carried a reference to the accident that befell the special train. It related that "yesterday afternoon" when the special train with Governor Stanford was following a few minutes behind the regular train, between Boca and Reno, "an immense log, three feet in diameter and fifty feet long rolled down hill by lumbermen and fastened between two ties, at 45 degree angle in the very center of the track." The account said, "The Engineer reversed brakes, when Mr. Harkness, riding in the cab discovered the danger. The collision destroyed the cow catcher. There were no personal injuries, except that Mr. Harkness sprained his ankle when he jumped from the train."[49]

There is other evidence that Harkness was riding on the cow-catcher or pilot instead of being in the cab, and that if he had not jumped just when he did he would have been crushed to death.[50]

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49. Sacramento Daily Bee, May 10, 1869, article signed O'L. This abbreviation stands for T.O. Leary, who was one of the 12 newspaper correspondents at Promontory Summit on May 10.

50. Ltr., George Kraus, Assistant Editor, Public Relations Department, Southern Pacific Railroad, to Roy E. Appleman, June 13, 1966. Edwin L. Sabin, in his Building the Pacific Railroad, J. B. Lippincott, Philadelphia, 1919, chapter 7, has "a guest" riding on the cowcatcher, who jumped and suffered a sprained ankle; also Sacramento Daily Bee, May 10, 1869.

According to the Sacramento Daily Bee article, the accident occurred between Boca and Reno. At the first station reached after the accident a telegram was sent ahead to stop and hold the regular train. Meanwhile, the crippled locomotive pulled Stanford's special at reduced speed until it came up to the waiting regular train. Stillman gives the location with some precision. He wrote: "It was near sundown when we reached the last crossing of the Truckee, where our crippled locomotive was sent into the hospital, and our cars were made fast to the regular train."[51]

The last crossing of the Truckee at the river's big bend, where it turns from south to west is at Wadsworth, Nevada, which had been founded just the year before. There is no mention of either Antelope or Jupiter in any of the contemporary materials I have seen in connection with the run to Promontory. But we know from photographs taken on 7-10 May, 1869 at Promontory that the Jupiter in fact did pull Stanford's train and was there on those dates. Lacking any evidence to the contrary, one may assume that Jupiter was pulling the regular train when Stanford's cars were attached to it at Wadsworth, and that it went on to complete the journey to Promontory Summit. Stillman records that most of the passengers on the regular part of the combined train left it at Elko where they set out for the White Pine country a hundred miles south of the railroad.

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51. Stillman in Overland Monthly, July 1869, 80.

Jupiter pulled the Central Pacific train into Promontory Summit on Friday ~~afternoon~~, May 7. Two telegraph operators had their tents pitched at the ends of the respective Union Pacific and Central Pacific lines, only a short distance apart. Stanford's party made telegraphic communication with the Union Pacific ceremonial party eastward and learned that it would be unable to reach Promontory for the scheduled ceremonies the next day, May 8, and that May 10 would be the earliest they could arrive. The reason given for the delay was flood and high water in the Weber canyon region, east of Ogden. There had indeed been high water there, but this was not the real reason for Mr. Durant's and his party's delay. The real reason was the forcible stopping of Durant's train by several hundred Union Pacific contract workers, mostly tie cutters, who had not been paid their wages for several months. They would not let Durant pass until he had wired to Boston and had the money sent to him he needed to pay the angry mob. This was not known to the Central Pacific officials at the time.

With ceremonies thus postponed to the 10th, the Central Pacific party had time on its hands. Some of the rough characters that had begun to congregate at Promontory made it dangerous to leave the protection of the Jupiter train, in the opinion of some of its passengers. Part of the group were taken on to General Casement's Union Pacific construction camp eastward, and from there they were taken to Ogden. The next day, June 8, Casement brought a special

train to the end of track and took those who had stayed behind with the Jupiter on a sight-seeing trip eastward to Weber Canyon. On June 9, Jupiter pulled the Central Pacific party back west about 30 miles from Promontory to Monument Point, where the party spent several hours along the shore of the lake. Apparently Jupiter pulled Stanford's cars back to Promontory that evening, for Stillman writes that "On the morning of the tenth, as we looked out of the car, we saw a force of Union Pacific men at work closing up the gap that had been left at their end of the road,..."[52]

The story of Jupiter after May 10, 1869 is mostly clouded in obscurity and lack of a recorded history. It went on to perform many years of service on the Central Pacific line between Sacramento and Ogden. All that is known certainly about its subsequent history is that it was renumbered #1195 in the general renumbering of Southern Pacific locomotives in 1891. Rebuilt in 1893 at the Sacramento shops, it was sold the next year, 1894, to the Gila Valley, Globe & Northern Railroad as its #1. At that time Jupiter received a new boiler and other changes were made, including an extended smokebox, side sheets and firebox, and new and different steam dome and sandbox covers, which changed its appearance considerably. It still retained, however, its cab, chassis, and tender as originally built, and it had its

52. Stillman, Overland Monthly, July 1869, 82.

original bell. The rebuilt Jupiter was scrapped about 1906 in Globe, Arizona.[53]

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53. Ltr., Gerald M. Best to Roy E. Appleman, March 16, 1966; Best, Memorandum on Central Pacific Locomotive No. 60 "Jupiter", to Roy E. Appleman, April 1966; Conversation, Appleman with Best at latter's home, Beverly Hills, California, May 3, 1966. Mr. Best says that in 1937 he talked with Mr. Seth Arkills of the Gila Valley G&N Railroad who at different times had been fireman and engineer on the rebuilt Jupiter, #1 of the GVG&N Railroad, and that the latter said it was commonly known in Globe, Arizona, that #1 was the old, historic Jupiter of Promontory fame. There was some talk of saving it, but in the end this came to nothing and the old engine was cut up for scrap at the Globe roundhouse.

Mr. Best has been of great help to me in assembling data on the history of the Jupiter. In his personal files, he has about 80,000 photographs of railroad locomotives and trains and approximately 40,000 negatives, and his library on railroad history is extensive. Among other materials in his possession are copies of several of the early manufacturer's locomotive lists and of railroad companies locomotive lists. His long acquaintance with David L. Joslyn of the Southern Pacific Railroad, who was stationed at the Sacramento shops, has given him access to some obscure railroad records. In addition, Mr. Best is recognized as being a devoted researcher and historian of American Railroads.

The railroad interests of the Big Four, Huntington, Stanford, Crocker, and Mark Hopkins' estate, underwent extensive reorganization in the summer and autumn of 1884, and effective April 1, 1885, the Southern Pacific emerged as the corporate head of these interests, with the Central Pacific in a lease arrangement to it. See Stuart Daggett, Chapters on the History of the Southern Pacific, New York, Ronald Press, Co., 1922, 149-152.

Sister Locomotives of Jupiter

Jupiter was one of 4 locomotives built by Schenectady for the Central Pacific Railroad at the same time and from the same order. These locomotives, listed below were identical.

Shop Construction Number	RR Number	Name	Date Completed at Factory	Renumbered	Scrapped
505	60	Jupiter	Sep. 1868	1195 in 1891 (rebuilt 1893)	1906
510	61	Storm	Sep. 1868	1273 in 1891 (rebuilt 1873) 1517 in 1908	1910
511	62	Whirlwind	Sep. 1868	1196 in 1891	1900
512	63	Leviathan	Sep. 1868	1197 in 1891 2d 1216 in 1901 1489 in 1908	sold 1908

In addition to the three sister locomotives of Jupiter, there were 11 other locomotives built by Schenectady for the Central Pacific that in effect were sister locomotives as they had the same specifications, all 4-4-0 type, with 60-inch driving wheels, 16x24 cylinders, and weighing for engines alone 65,450 pounds. They were all built between November 1868 and July 1869. They were the following:

CP #148	Red Fox
149	Black Fox
150	Grey Fox
151	Yellow Fox
152	White Fox
158	Eureka
159	Diana
160	Sultana
161	Juno
162	Flash
163	Fancy

These eleven locomotives had all been scrapped by 1901, except for #161, Juno, which was sold to the Nevada Northern Railroad in 1905 and survived until it was scrapped in 1931.[54]

Drawings, specifications, or photographs of any of these locomotives before they were rebuilt would provide usable information about the construction and appearance of any of the others, except of course for decorations, numbering, and naming which would be obvious differences showing on the photographs.

It may be of interest to note that the Central Pacific Railroad continued the practice of naming their locomotives down through #178, Frankfort, which is the last named locomotive in the CP blue print list in Stanford University Library. There were a few locomotives with earlier numbers that apparently did not have names, as these do not show on the Railroad locomotive list. It appears, therefore,

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54. Table prepared by Gerald M. Best for Roy E. Appleman, April 1966, of Central Pacific Railroad locomotives, based on his copy of Schenectady Factory List and CP Railroad List of locomotives. The writer's copy of the Central Pacific RR Locomotive List, made from the blue print copy he found in unclassified material at Stanford University Library vault, confirms the locomotive numbers, names, renumbering, driving wheel and cylinder dimensions, years built, and weight. Mr. Best informed the writer that his Schenectady Factory list is a copy obtained from a friend who made his copy from the Schenectady list he found at the American Locomotive Company, Schenectady, N.Y., in 1939. Also, ltr., J. W. Joyce, Historian Schenectady Historical Center, to Roy E. Appleman, March 23, 1966. Ltr., George Kraus, Southern Pacific Co., June 29, 1966 to Roy E. Appleman states their roster shows #61, Storm, was rebuilt in 1873.

that in early 1869 the Central Pacific discontinued giving names to their new locomotives.[55]

There are still other locomotives built just previous to CP #60, Jupiter, by the Schenectady Locomotive Works for eastern railroads that appear to be identical in specifications and appearance with Jupiter and its sister locomotives. This is what one would expect, since the 4-4-0 in the late 1860's was a standard piece of equipment for the time, and the Schenectady Works turned it out for general use on many railroads of the day. Mention of some of these earlier locomotives that were similar to Jupiter will be made in the section on photographs.

It may be of interest that the last steam locomotive the Southern Pacific Railroad (which after April 1, 1885 included the original Central Pacific) bought was #4294 in 1944 from Baldwin Locomotive Works of Philadelphia. It began service in March of that year. It is interesting to compare this huge steam locomotive with those of the Jupiter type of 1869. It is a 4-8-8-2 type, weighed 657,900 pounds (about 10 times the weight of Jupiter), and had a 67 foot, 3-inch wheelbase. From the cow catcher to the coupling device it measured 79 feet. 2½ inches. Its tender was 45 feet, 8 inches long. This last

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55. Central Pacific RR Locomotive List in writer's possession, copied from List in Stanford University Library.

steam locomotive of the Southern Pacific now stands in front of the Southern Pacific Railroad Station in Sacramento in Camellia Place, at 4th and Eye Streets.[56]

Not inappropriately, just across 4th Street from #4294 on the west side of the park stands a large, handsome bronze bust of Theodore DeHone Judah. It rests on bronze cross ties and the end of rails, and these in turn are on top of a huge granite bolder from the Sierras. This memorial to Judah was dedicated April 26, 1930 and carries the legend, "That the West May Remember."

Drawings for Jupiter

There are no known surviving construction drawings of the Jupiter or its sister locomotives. The fires that raged in San Francisco in 1906 after the earthquake there destroyed valuable records, most of the drawings, and many photographic negatives including old glass wet plates in the offices of the Southern Pacific Railroad. In 1917 a destructive fire broke out in the Sacramento shops of the Southern Pacific and destroyed several cases of old drawings and pictures of the Central Pacific and Southern Pacific Railroads stored in the loft of the car department.[57] Officials of the Southern Pacific Railroad

56. Some of the information taken from marker at locomotive by writer, 7 May 1966; Sacramento Daily Bee, April 19, 1957.

57. David L. Joslyn, "The Old Iron Horses of the Central Pacific," Railway and Locomotive Historical Society Bulletin, No. 7, 1924, 62.

who have recently instituted searches for drawings, specifications, and related historical data on the Jupiter and its sister engines have found nothing original and contemporary.[58] This has included a renewed search at their Sacramento shops. There do exist two diagrams of some significance, but their importance has to be carefully evaluated. They will be discussed later. But first, mention will be made of drawings that might be presumed to have survived in the records of the locomotive manufacturing company.

The Schenectady Locomotive Works, which built #60, Jupiter, was merged in 1901 along with 7 other locomotive building firms into the American Locomotive Company. Subsequently other mergers brought the total to 10 formerly independent companies that by 1905 made up the American Locomotive Company. The Schenectady Works, which had been started in 1848, was the principal company of those merged, and it became the manufacturing and operating headquarters of the American Locomotive Company after 1901.[59]

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58. Ltrs, George Kraus, Assistant Editor, Southern Pacific Company to Roy E. Appleman, June 13 and June 15, 1966; Ltr., B. F. Biaggini, President, Southern Pacific Company, to Representative David S. King, August 18, 1965.

59. American Locomotive Company, Locomotive Handbook, 30 Church St., New York City, 1917. This book gives history of the company and contains many mathematical tables on motive power, cylinders, specific gravity, metals, and other highly technical aspects of railroad and locomotive operations.

In recent years the American Locomotive Company has given way to another corporate reorganization and today survives as ALCO Products, Inc., with operating and manufacturing headquarters still at Schenectady and management and financial headquarters in New York City. I have tried through correspondence, both with the New York and Schenectady offices of ALCO to obtain information on early records of the Schenectady Locomotive Works, but thus far have received no answer to my letters. I believe, however, that the company probably has disposed of all the records it once may have had on the early companies. This is borne out by comments from Historian J. W. Joyce of the History Center, City Hall, Schenectady.

In the course of my searches I learned from a copy of a release dated December 23, 1959, in the files of the Simmons-Boardman Company Library in New York City, that ALCO Products in May 1958 gave all of the glass negatives and photographs of locomotives shipped from the American Locomotive Company or its merged companies between the 1880's and the 1920's to the History Center of the City of Schenectady. Included in the transfer were also builder's lists for the 10 merged companies.

In response to an inquiry, Mr. J. W. Joyce, the City Historian at the Schenectady History Center, confirmed that the Center does have more than 7000 negatives, 90% of them on glass and dating between 1885 and 1920. Their collection, he stated, contained no drawings or specifications, but did have builder's lists for all the 10 merged

companies. The Rogers list started in 1872; that for Schenectady in 1851. Only for the Schenectady company was there an Order Book. Mr. Joyce stated that it was his understanding that ALCO Products had retained none of the drawings relating to steam locomotives, but that several former employees of the company have collections of drawings, negatives, and photographs obtained from its early files. He stated he did not know the identity of these persons.[60] It appears, therefore, that early drawings and specifications may survive in personal collections of persons unknown to us, but that probably none remain in the possession of the companies constructing the Rogers and Schenectady locomotives, or their corporate successors.

Mr. Joyce said that the American Locomotive Company and ALCO Products have in past years been so bedeviled by requests for information on early locomotives from railroad buffs that they have adopted as a policy the ignoring of all correspondence received on the subject, and that persons who make calls on the company in person are confined to the receptionist's office. He wrote me he would expect that correspondence even from the Federal Government on the subject would be ignored. It has been. A personal visit might get some results, but even this is doubtful.

Now, to return to the two diagrams relating to the Jupiter that have survived in the files of the Southern Pacific Railroad.

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60. Ltrs., J. W. Joyce, City Historian, Schenectady History Center, to Roy E. Appleman, March 23 and April 13, 1966.

First in point of date is a small diagram 7½ x 6 inches in size, with the title, "Diagram of 16"x24" 8 Wheel Schen. Engine 1228 Rebuilt. Office Supt. MP and S.P.Co. Sacramento, Sept. 20, 1895." Below this heading is the lettering "1 engine this class in service Sept. 1895 Engine went into service August 26, 1892."

The significance of this diagram is that locomotive SP #1228 was the renumbered 161, which had been built in 1869 to the same specifications as Jupiter, and can be considered a sister locomotive. This diagram shows the engine as rebuilt in 1895 with a different smoke stack, driving wheel diameters of 64 inches instead of 60 inches, same size cylinder and piston stroke as in the original #161, but with a greatly increased weight load of 80,150 pounds. Only a close comparison of some of the other dimensions shown with those of the Schenectady 4-4-0 Standard American locomotive of 1869 will reveal the extent of other differences. Mr. Gerald Best believes this diagram of rebuilt #161, renumbered #1228, retains the same length of wheelbase, distance between driving wheel center, distance between pony truck wheels and other principal dimensions as the original Schenectady #161 of 1869. Mr. Best, who has this diagram in his collection, states that it is the only one that the late Mr. Joslyn was able to salvage of Southern Pacific shop drawings of the period from the 1890's through the early 1900's.[61] There appear to be no

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61. Memorandum on CP 60, Jupiter, Gerald M. Best for Roy E. Appleman, April 1966, with a copy of the #1228 diagram. Ltr., George Kause, Southern Pacific Co., to Roy E. Appleman, June 29, 1966, also includes copy of this drawing.

extant photographs of #1228 for this period. Mr. Best does have a photograph of CP #1273, which is the renumbered #61, Storm, a sister locomotive of Jupiter, which was taken in 1902. He feels that this good side view of #1273 can be used to scale dimensions of the original 1868 Jupiter, if that should be necessary. According to his opinion, the 1902 photograph of Storm shows it to have had original chassis, sandbox, and steam dome. Counterbalance weights had been added to the rear driving wheels, and an additional weight added to the main driving wheels. The boiler and steel cab are new, being typical Sacramento shop standard pieces of the mid-1890's.[62] This comment about photographs has been inserted here, rather than left entirely to a subsequent section because it has some use in connection with interpreting the diagram of #1228, a copy of which is included in this report. Mr. Best thinks the 64-inch driving wheels of #1228 are the same as the 60-inch driving wheels of Jupiter except that they have been provided with thicker tires. This raises many questions about practices in 1868 and later in referring to diameter of driving wheels center and with tires.

The second drawing from the files of the Southern Pacific Company is one that has just come to light and resulted from a search in June of this year (1966). It is a diagram of Central Pacific #60, Jupiter, and was prepared by David L. Joslyn in

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62. Ibid.

July 1944 at Sacramento. It measures approximately 25x12 inches, and shows a side profile with half sections of cab and front of locomotive. It indicates driving wheels of 63 inches diameter, and the legend notes that originally the Jupiter had steam pressure of 110 pounds but changed later to 125 pounds. The diagram is inscribed, "D.L.J. 7/5/44 Sac." It gives Jupiter dimensions to have been 8 feet between driving wheel centers, 11 feet 3 inches from front driving wheel center to rear front truck or pony wheel center, 5 feet 8 inches between pony wheel centers, the stack 5 feet across at its top, cab 64½ inches deep, main rod 85 3/4 inches long. Many other dimensions are shown. There was no indication in the file or on the drawing giving the sources that Mr. Joslyn used in preparing this drawing.[63]

It is not known at the present whether surviving members of Mr. Joslyn's family has any of his papers which might shed light on this question. It is a known fact that Mr. Joslyn was a long-time employee of the Southern Pacific Company at its Sacramento shops, was greatly interested in the history of its old locomotives,

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63. Copy of the Joslyn diagram of #60 Jupiter was an enclosure in Ltr., George Kraus, Southern Pacific Company, to Roy E. Appleman, June 13,1966. Mr. Kraus commented concerning it, "I have also found--and this is a great surprise to me--..." A search for the blue print or original drawing has not located it in the Southern Pacific files either in San Francisco or Sacramento. Joslyn worked in the drafting room of the Southern Pacific at Sacramento for more than 30 years, was familiar with the early pioneer locomotives of the Central Pacific and enjoyed a reputation for accuracy of detail. Ltr.,Kraus to Appleman June 29, 1966.

and that he may have come upon some old drawing that he used in making this diagram. Mr. Best's comment mentioned earlier in connection with the diagram of #1228, however, and quoting from a conversation with Mr. Joslyn, would indicate on its face that Mr. Joslyn had not found any such drawing relating to the Jupiter. For the present, therefore, the Joslyn diagram of #60 must be considered a most interesting item but not completely evaluated. A copy of this diagram is included as Appendix F.

Certain other diagrams and drawings not relating directly to the Jupiter will be useful in studying the problem of preparing Jupiter construction drawings. Of these, I mention particularly the scale drawing of a Baldwin 4-4-0 Standard American Locomotive and the accompanying table of dimensions shown as Plate V, in M. N. Forney, Catechism of the Locomotive, 1875 edition, 554-555. This locomotive has basic dimensions that are identical or nearly so with Jupiter, 60 3/4-inch diameter driving wheels, 16x24-inch cylinders, and engine weight of 65,000 pounds. The driving wheels of this engine are only 3/4 of an inch greater in diameter than those of Jupiter, an insignificant difference; other general characteristics appear to be just about the same.

But of all the extant diagrams and drawings of locomotives of the period that have been found, the most valuable for the construction of a replica of Jupiter, just as for Union Pacific #119, are the

Weissenborn construction drawings for the New Jersey Railroad and Transportation Company Woodburner No. 44, previously mentioned in the discussion of #119. The Colburn drawings of a Rogers locomotive, previously discussed, may also be useful. All the drawings and diagrams mentioned, used to supplement and correct where necessary the Weissenborn drawings, together with refinements taken from photographs, should result in producing an essentially correct set of construction drawings for Central Pacific #60, Jupiter.

The Weissenborn and Colburn Drawings are included in Appendices B and A, respectively, as stated earlier.

Specifications for Jupiter

There are no known extant specification sheets for Central Pacific #60, Jupiter. The closest approach to such specifications known to me are those discussed earlier in connection with Union Pacific #119. They would apply in a general way. These specifications and descriptions are included in Appendices C and D.

In connection with the appearance of early Central Pacific locomotives in terms of paint, trim, and decoration the following quotation from David L. Joslyn may be useful:

> Old employees of the Central Pacific always spoke of the original 163 locomotives of the Central Pacific as the 'Iron Horses.' Those old timers were iron, for as far as I can

learn there was very little steel about them. Considerable brass, gold leaf in trimming and lettering. Those used in passenger service had drive wheels painted a bright red. ...names in gold leaf on sides of cabs, stripes of gold wherever it could be applied with initials C.P and the number between the C. and P. on the tanks with more gold and shaded with green and red. Grab irons, hand rails, bands that held on the jacket, bell, whistle, safety valves and pumps of shining brass, rims of the mud guards edged with brass, head light painted a green color with gold stripes and every part of them shining.[64]

Photographs of Jupiter

Neither Rogers Locomotive Works nor Schenectady Locomotive Works had started the practice of taking photographs of locomotives as part of their construction records at the time #119 and Jupiter were built. This practice was started later, and for many later locomotives wet, glass plate negatives have survived in various collections. I have mentioned the large collection given by the American Locomotive Company to the Schenectady Historical Center. Thus, the only photographs of these two historic locomotives were those taken after they entered service, and these for the most part

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64. David L. Joslyn, "The Old Iron Horses of the Central Pacific," Railway and Locomotive Historical Society Bulletin, No. 7, 1924, 62.

are those taken at Promontory Summit in connection with the May 10, 1869 Golden Spike joining the rails ceremonies.

There were three photographers present at the ceremonies on May 10, 1869. Alfred A. Hart, official photographer of the Central Pacific Railroad, with his studio at Sacramento, had made the trip to Promontory Summit to photograph the ceremonies. Andrew J. Russell had come from New York for the same purpose as the official photographer of the Union Pacific Railroad. Charles R. Savage of the firm of Savage and Ottinger, Salt Lake City, was an independent photographer present. These three men took all the known pictures of the ceremonies, some of which have been reproduced many times in various books and publications, as well as in thougands of stereoptic view sets of the time and later. Often the pictures have been incorrectly attributed to one of the three photographers present when in fact, they were taken by another. Recent studies have shown that the best views were taken by Andrew J. Russell, but reproductions of perhaps the most widely used have been wrongly attributed to Savage.

Several of the best views of Jupiter were taken by Hart on the day before the ceremonies, when the Stanford party was killing time in going back to Monument Point and sight-seeing along the right-of-way and on the shore of Salt Lake.

A few pictures of Jupiter were taken later, almost by accident it seems. And there are a few surviving pictures of sister

locomotives of Jupiter. I have assembled as many of these as I could find, and they are included in Appendix G. Many of them have been obtained from stereo views which have survived in certain collections. The best collection relating to the Central Pacific Railroad I have seen is the one in the Timothy Hopkins Collection, Main Library, Stanford University. Timothy Hopkins was the foster son of Mark Hopkins, one of the founding "Big Four" of the Central Pacific. He made a notable collection of early American railroad history, and left this collection to Stanford University. A valuable item for our present purpose is a large album containing about 300 stereo views showing the construction history of the Central Pacific Railroad. The pictures cover the route from the Sacramento docks to and across the Sierras, and hence over the Nevada and Utah deserts to Promontory. The pictures were taken mostly by Alfred A. Hart, and cover construction work between 1866 and 1869.

There are in addition a number of excellent photographs of Standard American 4-4-0 locomotives built by Schenectady about the same time the Jupiter came from its shops, as indicated by the shop work order numbers. Examples of these are Schenectady No. 472, completed January 1868 for the Utica and Black River Railroad, almost identical to Jupiter. And there is Schenectady No. 577, completed August 1869, and apparently identical to Jupiter, except for naming, railroad identification, and some aspects of paint decoration. Just as a Chevrolet Impala 4-door hardtop today, for

instance, is basically the same automobile whether sold and used in Cleveland or Santa Fe, so the Schenectady Standard American 4-4-0 locomotive of 1868 and 1869 was the same to all buyers with only minor decorative differences.

There appears to be no good reason to list here the photographs that appear in Appendix G relating to Jupiter. The photographs that have been collected relating to Jupiter will be found in that appendix.

It may be of passing interest to comment on photographs that sometimes appear in print representing locomotives said to be Jupiter or Union Pacific #119, but in fact are not. Most of these stem from two sources. One of these is Cecil B. De Mille's well known movie "Union Pacific" filmed by Paramount Studios in 1939. For that picture, Paramount fixed up Virginia & Truckee locomotive #18, which it bought for the purpose, to look somewhat like Union Pacific #119, and Virginia & Truckee locomotive #22 which was made to resemble Central Pacific #60, Jupiter. Metro-Goldwyn-Mayer Studios bought Virginia & Truckee locomotive #11 for movie making purposes. All three locomotives are retained by their studios today as valuable properties, and are in operable condition. V&T #18 is a Central Pacific Sacramento Shop built locomotive, dating from 1873; V&T #22 is a Baldwin built locomotive, dating from 1875.[65]

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65. Ltr., Fred A. Stindt, Chairman, Pacific Coast Chapter, Railway & Locomotive Historical Society, to Roy E. Appleman, March 3, 1966; Ltr., Gerald M. Best to Roy E. Appleman, March 16, 1966, and Gerald M. Best, memorandum report on Jupiter for Roy E. Appleman, April 1966.

The second common source of erroneous pictures representing the Jupiter and Union Pacific #119 are those of the two engines that were used to represent these two historic locomotives at the New York World's Fair in 1939 and 1940 and subsequently in the Chicago Railroad Fair of 1948-1949. Virginia & Truckee locomotive #12, Genoa, Baldwin, 1873, represented Jupiter; and rebuilt Hannibal & St. Joseph Railroad locomotive #66, originally built in 1892 and owned by the Burlington Railroad, represented Union Pacific #119.[66] They had the names and numbers of the original Jupiter and #119 and their owning railroads painted on them and their tenders, but anyone reasonably well acquainted with the appearance of the originals can easily detect the differences.

Tenders

It may be well to say a word about tenders, because the intent is to have tenders with each locomotive at the Golden Spike NHS. They are generally considered a part of an operating locomotive unit, and are usually included in illustrations of locomotives. Most of the photographs of #119 and #60, Jupiter, show their tenders. The tender for the Standard American 4-4-0 locomotive of 1868-1869 was a fairly uniform piece of equipment, and no special problem is anticipated in constructing replicas.

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66. Reed Kinert, Early American Steam Locomotives, 1st Seven Decades 1820-1900, Superior Publishing Co. Seattle, 1962; Conversation Roy E. Appleman with Gerald M. Best, Pacific Coast Chapter, American Railway and Locomotive Historical Society owns the Genoa and expect to display it in San Francisco.

The Genoa was given to the Railway & Locomotive Historical Society, Pacific Coast Chapter, and is presently stored in West Oakland. It will be featured in the Railroad Museum projected for Aquatic Park, San Francisco.

There are construction drawings of standard tenders of the period in the Weissenborn drawings in Appendix B, and there are diagrams of them in some of the other appendices to the report.

There is in existence at Traveltown, in the San Fernando Valley, on the outskirts of Los Angeles, Stockton & Eastern locomotive #1 with its tender. This locomotive was built in 1864, a 4-4-0 of nearly the same specifications as Jupiter. Its tender as it stands in Traveltown today is nearly all original, still having the old tank in it. The locomotive was originally built by the Lancaster Works at ~~Norris~~ Lancaster, Pennsylvania for the Western Pacific Railroad. If needed, the basic dimensions and specifications of this tender could be taken from the original and used in the drawings for Jupiter and #119 tenders.[67] But I do not anticipate this will be required.

Tenders were necessary adjuncts to locomotives. They did two things. They carried a supply of water for the locomotive boiler; they carried fuel to burn in the locomotive firebox to heat the water to make steam. Steam pressure operated the pistons in the cylinders and the driveshafts that turned the wheels and made the engine move.

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67. The writer examined this locomotive and tender with Mr. Gerald M. Best on May 3, 1966. According to Mr. Best, this tender is just about what both the Jupiter and #119 carried with them as original equipment.

The water tank in the tender for the 4-4-0 locomotive of 1869 was U-shaped, extending around both sides and across the rear end of the tender. The opening at the throat of the U and extending back a little more than half way of the tender frame was for the storing of fuel, generally wood at this time. The same space could be used for coal in the event the locomotive was a coal-burner. Wood was often piled on top the water tank as well as in the open area of the U. There would be no difference in 1869 in the tender for a bituminous coal burning 4-4-0 Standard American locomotive, such as was Union Pacific #119, and the Central Pacific #60, Jupiter, which was a wood-burner.

The tenders for the two locomotives that met at Promontory Summit carried either 2,000 or 2,200 gallons of water in their tanks, and as much wood as could be piled on. If coal was used about 3-4 tons could be carried. An empty tender would weigh in the neighborhood of 20,000 pounds. If loaded with water and fuel it would weigh 40,000 to 45,000 pounds. The typical Standard American 4-4-0 locomotive of the late 1860's with loaded tender would weigh about 100,000 pounds.[68]

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68. M. N. Forney, Catechism of the Locomotive, 1875 ed.,357.

ESTIMATED COSTS OF REPLICAS

As a prelude to discussing the probable costs of making replicas of Union Pacific #119 and Central Pacific 60, Jupiter, and their tenders, it should be stated that there is no alternative to making the replicas if the two locomotives are to be represented at Promontory Summit. There are no locomotives like them in existence, so far as I have been able to determine. This has been confirmed by every "expert" I have talked to or written to on the subject. There are a few surviving old locomotives, perhaps half a dozen in all, that resemble in some considerable degree one or the other of the two we are concerned with here. But they are owned either by institutions that hold them as a part of a collection they would not part with, or by Hollywood studios for movie-making purposes and are not for sale. In one instance the Pacific Coast Chapter of the Railway and Locomotive Historical Society owns an old period locomotive. This locomotive is already committed to an outdoor railroad museum projected for San Francisco.

Congressman David King, of Salt Lake City, Utah, asked the State Department to make inquiry of its embassies in all South American and Latin American countries concerning the possible presence in their railroad systems of American built locomotives of the 1860's or 1870's period. It is known, of course, that many locomotives in past years were sold to these countries for their relatively primitive railroad systems after the locomotives had

become obsolete for use in the United States. It was thought that suitable period locomotives of the 1860's or 1870's might be found there and with slight modification could represent Jupiter and Union Pacific #119. Representative King's office has now received replies through the StatemDepartment from most of the embassies in South American and Latin American countries. None of the responses list any locomotive that comes close to being what is needed. Representative King has supplied me with copies of the cablegrams.

Also, with reference to the possibility of period locomotives being available in Mexico, Mr. Gerald Best told me that he has made several trips into Mexico to examine their older American-built locomotives of the 4-4-0 type, and he has found nothing that goes back to the 1880's, not to mention the 1860's. Even what there are of the 1890-1900 period have been rebuilt in one or several features, including nearly always new boilers.

Replicas can be of two types. First, there could be an operating locomotive, one that would have boiler, firebox, all the necessary working valves, cylinders and pistons. It could be fired up and run on rails. All the working parts would have to be machined to a close tolerance to assure satisfactory operation on a standard gauge railroad. Most of the parts would have to be literally hand-made, because locomotives of the type required are no longer built in this country. It has been thought impractical to consider

having them built abroad, in Japan, India, or possibly West Germany, for instance, where steam locomotives are still being proguced. An operating locomotive would be very costly.

A fairly reliable estimate of cost for an operating locomotive like Jupiter or Union Pacific #119 was supplied by the Union Pacific Railroad to representative King in a letter from President Edd H. Bailey, dated September 20, 1965. The cost was given as about $500,000. In my discussion with Mr. Ed Shafer of the Union Pacific Railroad Company, he confirmed that this estimate was made by the motive power division of the Company at President Bailey's request, and that he would consider it as reliable as one could obtain today.[69]

The second type of replica would be a shell without interior working parts. There can be many types of shell replicas of the two locomotives with the cost varying according to type. Essentially, the cost of a shell will depend on materials used, concern for authentic appearance, and on whether the wheels will turn on the axles and the locomotives are capable of moving on rails with power supplied externally.

The estimates of cost of building replicas as given in the Congressional Hearings by the National Park Service was $100,000

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69. Ltr., Edd H. Bailey, President, Union Pacific Railroad Company to Representative David S. King, September 20, 1965; Conversation, Roy E. Appleman with Ed C. Shafer, Director of Public Relations, Union Pacific Railroad Company, Omaha, May 13, 1966.
Mr. Gerald M. Post is of opinion the $500,000 estimate is too high. He thinks the locomotives could be built operational at about $125,000 - $150,000. This is on basis that MAPO Inc. of Glendale, Calif. did the work, with Wilmington Iron Works Los Angeles, doing all the steel and iron castings and the Dixon Boiler Co. of Los Angeles Calif. the boilers. He thinks boilers for Jupiter & #119 would cost about $25,000 Ltr. Post to Appleman, August 10, 1966.

for each locomotive. It is not clear whether this included estimate of costs for tender. And there was no definition whatever of the kind of replica intended. In fact, it is clear that the subject was never seriously studied. The estimates were supplied by the Southwest Regional Office, and this in turn, it appears, rested upon figures provided rather casually by the Hurlbut Amusement Company, Inc., of Buena Park (south Los Angeles), California. The Hurlbut Amusement Company has in the past manufactured some period type miniature railroad equipment for amusement parks, and currently holds certain concessions in the Knott Berry Farm, in Buena Park, which uses equipment of this type.

On May 4, 1966 I called at the offices of the Hurlbut Amusement Company and had extensive discussions with Mr. Bud Hurlbut and Dick Bagley of the Company. Mr. Bagley is a draftsman and a locomotive buff who would be responsible for the work done by the Company in any construction of replicas it might undertake. He has given assurances that the Hurlbut Company could build the replicas. But both he and Mr. Hurlbut said categorically that they could not estimate the cost of the replicas until they had studied any specifications we might supply--that the cost would probably not be under $100,000, and that it might very well go materially above that figure. I told both men that in any replica that was built the National Park Service would be interested in only scale size replicas

with fidelity to detail and authentic appearance. The type of work they have done in the past for the amusement parks, usually for 24 or 36-inch gauge and at half or 2/3 size, with only the most casual attention to period appearance, would not do for us.

Also, in looking over their plant, which is in a corner of the Knott Berry Farm development, I noted that it has no equipment for the manufacture of a locomotive replica except some machines for milling metal. There are no foundry and casting facilities, no pattern making shop or workmen. In short, practically all the work on a replica would have to be sub-contracted out to other firms in the Los Angeles area. About all the Hurlbut people could do would be to prepare drawings where necessary based on Mr. Baley's knowledge and skill, if we want to trust to that, and then to assemble the engine after the various parts had been manufactured elsewhere and delivered to it. I would consider this an unacceptable arrangement and not in the interest of the project. No one in the National Park Service to my knowledge has discussed this subject with any other prospective manufacturer.

I mention this matter in the manner I have to emphasize that no one in the Service, nor any of the railroad and locomotive fans, buffs, and "experts" with whom I have talked, can give even an approximately realistic figure of what shell replicas will cost.

The only way the Service will be able to know approximately what the replicas will cost is to obtain bids based on specifications and construction drawings of the equipment it wants reproduced.

RECOMMENDED PROCEDURE: Construction Drawings and Bids

I believe there is only one sound way to proceed from this point toward building replicas of the two locomotives. The Service must produce working or construction drawings of the two locomotives and their tenders which can be sent to prospective bidders, obtain bids from them on the basis of the drawings and this report, and only then will we know what the replicas will cost. My own view in this is supported by that of Mr. John H. White, Jr., of the Smithsonian Institution, Mr. Gerald Best of the Railway and Locomotive Historical Society, and by Mr. Bud Nurlbut and Dick Bagley. This is the only way the Service can control the product and indicate in some detail just what is wanted as to form and standard, and it is the only basis on which a manufacturer can tell precisely what is to be built and bid accordingly.

The next step ahead for the Service, therefore, is to obtain construction drawings of the two locomotives. This will have to be done on a contract basis with a locomotive draftsman. Fortunately, I have been able to locate a qualified person through the assistance of Mr. John White of the Smithsonian Institution. He is Mr. Keith Buchanan, P. O. Box 217, Amsterdam, Ohio 43903. Mr. Buchanan has done locomotive and railroad equipment drafting for Mr. White and

the Smithsonian Institution. He is also an early locomotive enthusiast and buff. He is a free lance draftsman. Preliminary correspondence with him on the subject shows that he is eager to undertake the work because of a personal interest in the reproduction of the two locomotives and a desire to make a contribution to the Golden Spike project. His price for the work would be extremely modest, in my view, based on some tentative estimates he has given for it. Mr. White recommends him for the work. I believe he is the best person for the work within my knowledge. I have seen samples of his draftsmanship in drawings on file at the Smithsonian Institution. Mr. White has volunteered to give some guidance and a assistance to Mr. Buchanan as the work progresses, if it is needed. The Smithsonian Institution has agreed formally in writing that Mr. White may serve as a consultant to the National Park Service without pay in our efforts to produce authentic replicas of the two historic locomotives.[70]

I recommend that the Service approach Mr. Buchanan without delay to see if he will be willing to undertake the preparation of the construction drawings, using our research material as a basis. We will have to indicate rather closely the degree of authenticity we want and the degree of detail to be included in the drawings.

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70. Ltr., Robert P. Multhauf, Director, Museum of History and Technology, United States National Museum, Smithsonian Institution, to Assistant Director C.P. Montgomery, National Park Service July 12, 1966.

Mr. Buchanan can then supply an estimate of the fee he will require, and on that basis the Service can issue a personal services contract to him. The contract probably should be executed by the Southwest Regional Office. If there is any advantage, it could be issued here and the Washington Office reimbursed by the Southwest Regional Office. I should think the cost of preparing the construction drawings should be borne by that office. I will be glad to prepare the correspondnece to Mr. Buchanan on this matter.

I have considered other possibilities of getting the drawings prepared. For instance, I learned when I was in Omaha that Mr. Bert Flagg, formerly chief draftsman for the Union Pacific Railroad, has retired, and is living in Council Bluffs, Iowa. He might be interested in doing the work. No one has been in communication with him on the subject, however, and his attitude is unknown. Mr. Frank C. Harmon of Omaha also has done some locomotive drafting, and might be available. I learned the names of one or two persons on the west coast who have done work of this kind, but in each instance it has seemed to me that the distance from our supervision and ability to check on the work, and other unknown factors, plus certainly a higher fee, have turned the issue in favor of trying to get the services of Mr. Buchanan. This is what I recommend. There is no one in the National Park Service with the background training and knowledge necessary to do the work.

When the drawings have been completed, and bids obtained, the Service will be in a position to know whether it will have the funds to proceed with contracting for the work. If it does not have available the needed funds, it can attempt to supply the deficiency in a number of ways:

1) approach the Union Pacific Railroad Company and the Southern Pacific Company to have them build the replicas either as an operating or a shell type of replica, as an historical contribution and a public relations gesture; 2) obtain a financial donation from one or both companies to supplement Federal appropriations; 3) the two companies might contribute use of railroad machine shops and skilled personnel and labor in building the locomotives or parts of them (I understand that the Union Pacific has facilities in which it can build a locomotive if it so desires; 4) obtain financial aid from the Utah State Golden Spike Centennial Commission; 5) obtain a grant from a suitable foundation; 6) obtain additional Federal appropriation .

I estimate that it will take 2-3 months of steady work to prepare the construction drawings. Perhpps a month will be needed thereafter to obtain bids on constructing the replicas. If each step of the necessary process is hurried forward without delay from this point, the Service should have the information at hand by the end of calendar year 1966 to know what it will cost to build the locomotive replicas, and can estimate its future course to accomplish their manufacture and installation at the Golden Spkke Site by May 1969.

I am prepared to suggest a number of names of prospective bidders and manufacturers of the replicas at the appropriate time. I do not believe they should be made a part of this report.

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The above material, together with the appendices, conclude the report on the locomotives themselves. A few additional subjects might be mentioned briefly here as having a close association with the replica locomotives and the related interpretive development of the Promontory Summit area.

Railroad Roadbed and Rails at Promontory Summit

The grade of the railroad track at Promontory Summit is practically level for the 1 mile section it is proposed to restore. The track for this distance would be rebuilt, according to present interpretive planning, with approximately half of it to the west of the locomotive meeting point, representing Central Pacific track, and half of it to the east, representing Union Pacific track. Approximately half a mile west of the Golden Spike site a low spur ridge of the South Promontory Range cuts off view of the right-of-way, which swings in a gentle curve southwestward from the Summit and Golden Spike site. The roadbed and rails should be restored to this point. Eastward from the Summit site, the right-of-way and track would be in view for a greater distance, but half a mile should be adequate to carry the track about as far as the eye will be able to see it reasonably well.

The roadbed will be of a primitive type. There should be only shallow ditch on either side--just enough to scrape up enough earth to form a low roadbed. This roadbed will be narrow, just wide enough to carry the ties and the standard gauge rails of 4 feet $8\frac{1}{2}$ inches. The roadbed will not, on average, be more than a foot or two in elevation above the adjacent land it traverses. Historic photographs show clearly, and better than any words, just what this was, and should guide the reconstruction. A number of these photographs are included in the appendices. Several are of specific points within the area where the track will be reconstructed.

Weight of Rails: The Union Pacific laid down rails of only 40 pounds to the yard when it first started construction at the Missouri River. By 1866, however, it was using 50-pound rail, with 45-pound rail for sidings. Three years later when its line reached Promontory Summit it was laying 56-pound rail. The rail was of Pennsylvania wrought iron. The law required that the iron used in building the track be American made. The 56-pound rails were normally 28 feet long, connected by fish plates. By the time the first transcontinental railroad was completed at Promontory Summit in May 1869 the weight of rolling stock had just about reached the limit that 56-pound rail would support. And soon thereafter steel replaced wrought iron in rail manufacture.[71] The Central Pacific also used American made 56-pound, wrought iron rails for its track at Promontory Summit.

The reconstructed track at Promontory Summit, therefore, should use rail weighing 56 pounds to the yard. Fortunately, this will be available as a donation. The Union Pacific Railroad Company has a small quantity of this rail on a minor branch line, and has offered to make a donation of enough of it to lay a mile of track at Promontory Summit.[72] This is a valuable contribution in terms of

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71. John D. Galloway, The First Transcontinental Railroad, New York, Simmons-Boardman Publ. Corp., 1950, 271; Wesley S. Griswold, A Work of Giants, New York, McGraw-Hill Book Co.,Inc., 1962, 136; Nelson Trottman, History of the Union Pacific: A Financial and Economic Survey, New York, Ronald Press, 1923, 56.

72. Conversation, Roy E. Appleman,NPS,with Ed. C. Shafer, Director of Public Relations, Union Pacific Railroad, May 13, 1966; Ltr., Edd H. Bailey, President, Union Pacific Railroad Co., to Assistant Director Howard Baker, National Park Service, June 25, 1966.
Central Pacific rail varied from 56-pound to 65-pound rail, but that used at Promontory was 56-pound rail. Initially, the company had ordered 60-pound rail, heavy for that time. Galloway, 141-142, 159.

making it possible to secure historically authentic rail type, and it also represents an unknown but undoubtedly considerable financial gift because the cost of manufacture of a mile of special 56-pound rail would be high.

At the present time on trunk lines, rails weigh from 85 pounds to the yard upward, with some of them weighing as much as 174 pounds. No rails on Class I rail lines weigh less than 60 pounds to the yard.[73]

Railroad Ties, 1869, at Promontory Summit: Because putting down ties on which to lay rails will be a restoration feature at Promontory Summit, it will be well to note here what is known of the kind and quality of tie used by the two railroads. Interestingly, there was a marked difference between them in the kind of tie used. This is apparent from a study of the historical photographs of the Golden Spike ceremony which show the meeting point of the tracks and clearly delineate with detail the kind of ties placed by both railroads.

The Central Pacific used sawed and squared ties, with sawed ends; the Union Pacific used rough sections of small trees, the bark left on, and the ends chopped to angled points by axes, with one sdde adzed to make a relatively level surface on to which the tie was laid and spiked down. The effect was to give the Central Pacific

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73. Association of American Railroads, Quiz on Railroads and Railroading, booklet, 13th Edition, Washington, D.C., 1964, item 27.

ties an appearance not much different from those used today, while Union Pacific rails were laid on very primitive looking ties. The Union Pacific ties were also of unequal length, whereas those of the Central Pacific were relatively uniform in length. Photographs of the track at the Summit in 1869 show these characteristics clearly. These will be found in an appendix to this report.

Both companies faced great difficulties in obtaining the ties they needed. For hundreds of miles from the beginning of its track at Omaha, Nebraska, the Union Pacific was building across treeless plains. About 2,300-2,640 ties were required for a mile of track. The Union Pacific cut ties up and down the Missouri River from Omaha, and floated them on rafts to that point. Perhaps 1/6 of them were of red cedar or oak, and most of the remainder cottonwood. These were treated with an impregnation of zinc in a treating plant built at Omaha. The farther west into the plains the track built, the more expensive became the unit cost of ties. In later investigations into the cost and manner of building the railroad, testimony was given to the effect that in certain places ties cost $5 each.[74]

The first place west of Omaha that ties could be cut along the right-of-way was in the Black Hills of Wyoming west of Cheyenne. Beyond the Black Hills there were several hundred miles of bleak,

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74. Galloway, 271-282; Griswold, 136; Trottman, 56.

treeless, upland plateau desert. Finally, in the Uinta and Wasatch ranges of Utah forests provided a source of timber for ties. In the Salt Lake basin Mormon contractors cut ties along the western slopes of the Wasatch and hauled them to the roadbed, or in some cases, floated them across Great Salt Lake to the vicinity of the right-of-way. The railroad ties used by the Union Pacific at Promontory Summit came from the canyons and slopes of the Wasatch eastward. They were all cut by axe, adzed on one side, angled at both ends by axe cuts, and had the bark left on except for the one side.

The Central Pacific, in contrast to the Union Pacific, at first had an ample supply of timber for ties. This source was at hand alongside the grade until the track had crossed the Sierra Nevada and emerged from the Truckee River valley into the great basin desert that continued unbroken eastward to Great Salt Lake and Promontory Summit. Across this Nevada and Utah desert the Central Pacific faced the same kind of problem the Union Pacific had confronted in building across the plains--it had to cut ties elsewhere and transport them as it built eastward. The source of supply for all the ties on the Central Pacific track across the desert were the forests of the eastern slopes of the Sierra in the Truckee valley and its vicinity. There it set up sawmills for producing bridging timbers and ties. A correspondent for the

Sacramento Daily Bee in 1869 said there were "some 30 sawmills at Truckee."[75] As the railroad neared completion many of these sawmills became idle as the need for timbers and ties came to an end. Thus, ties from the Wasatch and the Sierras held the rails that joined on the upland desert at Promontory Summit.

More need not be said on this subject here since the historical photographs taken at various points along the transcontinental railroad, and particularly at the Golden Spike site, show clearly the characteristics of the ties each railroad used at that point. These photographs are in the appendices.

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75. Sacramento Daily Bee, XXV, No. 3803, May 7, 1869, article signed "O.L."

PROMONTORY SUMMIT ON MAY 10, 1869

The Golden Spike scene at the ceremonies on May 10, 1869, is the most historic moment to be captured for Promontory Summit in the interpretive program there. It is of some importance, therefore, to know what the site looked like at that time. There are conflicting accounts in the literature, and particularly in the captions of photographs which purport to show what the place looked like on May 10, 1869. Many of the photographs, although so captioned, were not taken on May 10 but later, and accordingly they show many more tents and structures than were actually there at the time.

There will be no effort made here to give this subject exhaustive treatment, as that would require extensive research, and this study was not undertaken for that purpose in any event. The development of the railroad junction town of Promontory after May 10, 1869 should be the object of a special research study because the facts about it will be needed in planning the interpretive program of the Golden Spike area. And there should be a similar study on the extent and location of the Union Pacific construction camps on the eastern slope of the North Promontory Range and at its eastern base. But for the moment my purpose is to indicate only what will be immediately useful, that came to my notice during work on the locomotive problem, in planning the development for the locomotives in a May 10, 1869 setting at the summit.

The Central Pacific reached Promontory Summit with its track ahead of the Union Pacific, which was delayed by heavy rock excavations in cuts and building a high trestle on the steep east face of the North Promontory Range. On April 28, 1869 the Central Pacific was within 4 miles of the summit meeting point, and from there on the grade to the junction point was relatively level and of easy construction. The Union Pacific jumped ahead of its end of track and began putting in a siding at the Summit on May 1. On that day the Central Pacific completed its rails to the summit meeting point.[76]

During this last phase of the building of its track to Promontory Summit, the Union Pacific construction camps were scattered at different points on the east face of the North Promontory Range and at its eastern base near Blue Creek. They had such names as Painted Post, Hell's Half Acre, Last Chance, Murder Gulch, Commissary Camp, and Deadfall.[77] Pictures of them are often confused with Promontory at the summit, and narrative

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76. Robert M. Utley, "Special Report on Promontory Summit, Utah (Golden Spike National Historic Site)," National Park Service, Region Three Office, Santa Fe, N.Mexico.,Feb. 1960, 56. This is an excellent orientation report on the building of the transcontinental railroad.

77. Utley, 57; Ltr., Mrs. Bernice Anderson to Roy E. Appleman, July 15, 1966. Mrs. Anderson is President of the National Golden Spike Society, lives at Corinne, Utah, and has long been a local student of the Golden Spike site.

texts about Promontory often actually relate to one or the other of these construction camps. The exact location of these camps needs to be determined by research. Needless to say, some of them were tough, tough places.

As evidence of this, a Mr. T. O. Leary, correspondent for the Sacramento Daily Bee, wrote a dispatch for his newspaper from Promontory Summit on May 10, 1869 in which he described the reputation of the Union Pacific construction camp about 6 miles eastward of the summit when he arrived there on May 8. He said there were many "hard cases" in the vicinity, including one person known as "Behind the Rock Johnny, the hero of 5 murders and unnumbered robberies." Speaking of the main construction camp near Blue Creek he said there had been 29 murders there in one month during the past winter, with 8 in one day.[78]

Leary noted that the Union Pacific laid the last ½ mile of track on May 9 to close the gap with the Central Pacific. This left only the 56 feet of bare ground without either ties or rails separating the two lines. This gap was the length of two rails, one pair to be put in place by each company on the next day at the time of the ceremony.[79]

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78. Sacramento Daily Bee, XXV, No. 3808, May 13, 1869.

79. Robert L. Harris, "The Pacific Railroad--Unopen," The Overland Monthly, September 1869, 252.

In his dispatch dated 10 May, Leary said there were 17 tents at the summit, half put up since his arrival 2 days before. Railroad boxcars were being used as offices and boarding houses for some railroad officials. He noted on May 9 that the last transfer of passengers by stage between the Union Pacific and Central Pacific lines took place, and that on that day 40 bags of mail weighing about 3 tons were transferred from the Union Pacific to the Central Pacific.

Another eye-witness of the May 10 ceremony, Dr. J. D. B. Stillman, arrived at Promontory on the morning of Friday, May 7, as a guest of Governor Stanford on board the Stanford Special. He said there were two or three tents pitched in the vicinity of Promontory Summit for the rendezvous of ruffians in the neighborhood. There were also the tents of two telegraph operators of the two railroads within a few rods of each other. Any tents and other building features that might have been near the summit earlier had been removed to the east base of the Promontory Range, and as the day for the ceremony approached the summit site was one of open, upland desert sage brush country, save for the two railroad grades and a few tents.[80]

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80. Dr. J. D. B. Stillman, "The Last Tie," The Overland Monthly, July 1869, 81. This is a most interesting and useful article by one who made the trip from Sacramento with Governor Stanford, and was written almost immediately after the return of the California party from the Golden Spike ceremony. Griswold says there were 2 tents at Promontory Summit on May 7 (A Work of Giants, 318). He places 14 tent saloons there on the 10th (p. 324).

The historic photographs taken at Promontory Summit on May 10 show that most of the tents there were on the north side of the railroad track. There were a few, perhaps three or four at most, on the south side. The town of Promontory that grew up later at this point was mostly on the north side of the track, and this fact should be taken into account in the developments at the site and subsequent interpretation of the summit area.

It is important in locating the Golden Spike site and positioning the two replica locomotives, if they are constructed, to know that the meeting took place on the Central Pacific grade which was the northern one of the two at this point. The Union Pacific grade ran to the south of the Central Pacific across the summit area, distant from it 100-200 feet.

The connection was made at the end of the Central Pacific track at the summit because it had its rails laid down first and the Union Pacific had to make connection to it. The historic photographs show this condition clearly. At the present time, the county dirt-gravel road that runs west from the Golden Spike site is, I believe, on the alignment of the original Union Pacific grade. At the time of the ceremony, the Union Pacific grade did not have ties or rails on it at the summit. A siding approached the spot from the east but did not come quite to the summit meeting point on this grade.

I recommend that the Union Pacific grade be re-established in the immediate vicinity of the Golden Spike site as an historic feature. This will mean the obliteration of the county road for a short distance in this vicinity west of the site.

The Golden Spike monument was placed in 1915 where it stands today just south of the original Central Pacific grade, which became the operational line of the railroad. The actual junction site of the two locomotives, therefore, would be on the Central Pacific grade, which is still clearly visible, just opposite or on the north side of the monument. A United States flag was raised on a telegraph pole on the south side of the track at the junction point. This flag shows in several of the historic photographs taken ther on May 10 and later, and serves as a marker of the site in the changing scene. A replica of this telegraph pole and a 37-star flag should be re-established here as an historic feature of the scene. The photographs can be used as restoration guides.

In July 1869, about 2 months after the Golden Spike ceremony, William Henry Jackson visited Promontory Summit and photographed the site. The flag on the telegraph pole was still there. Many additional buildings had risen on the north side of the track.[81] This picture is sometimes mistakenly reproduced as having been taken on May 10.

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81. See p.100

Leary reported from the site to his newspaper, the Sacramento Daily Bee, in a dispatch written on May 10, that the Union Pacific broke ground on May 9 for a Y on which locomotives and cars could be turned around, and that the Central Pacific intended to build a turntable. He said that the Central Pacific would have to back its trains 70 miles from the summit before they could turn around.[82]

Nine years after the joining of the rails, we know there were still important railroad activities at the summit, although many of the structures that had hastily been erected there in the months immediately following May 1869 had disappeared after the junction point was moved to Ogden (5 miles west of Ogden) in November of that year. A guide book of the transcontinental railroad line, published in 1878, described some of the features at the summit, stating there was a well kept eating house for railroad and train men and a 3-stall roundhouse, as well as other buildings.[83]

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81. William Henry Jackson, Time Exposure: The Autobiography of William Henry Jackson, G.P. Putnam's Sons, New York, 1940, 175-179. This work quotes from a diary Jackson kept of his journey from Omaha, and one entry indicatès that he was at Corinne, Utah on Friday July 9, 1869. He must have been at Promontory Summit within a day or two of that date. Lucius Beebe, The Central Pacific and Southern Pacific Railroads, Berkeley, Howell-North, 1963, has a fine collection of photographs of the Promontory ceremony, but his captions and text are not always accurate and must be used with discretion.

82. Sacramento Daily Bee, XXV, No. 3808, May 13, 1869. This newspaper printed in its May 15, 1869 issue a dispatch written by Leary at Promontory on May 11 giving an account of the situation, in which he said, "All is quiet at 'the front'...the crowd has departed."

83. Henry W. Williams, The Pacific Tourist: Illustrated Trans-continental Guide, New York, Henry W. Williams, 1878, 155-156, 164. This volume has wood cuts of views along the route and a time table then in effect. The Central Pacific and subsequently the Southern Pacific maintained facilities there until after the Lucin Cut-off was built in 1906.

The fare from New York to Sacramento, over the Union Pacific and Central Pacific lines from Omaha westward, in May 1869 was $190.35 for the 3,377 miles. From Omaha over the Union Pacific to Promontory Summit was a distance of 1,086 miles; the fare at 7¢ a mile was $76.02. From Promontory to Sacramento the distance was 695 miles; the fare was $82.33, at 11.84¢ a mile.[84]

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84. American Railroad Journal, May 29, 1869, XXV, No. 22, vol. 42, 593.

There has been a multiplicity of nomenclature in the literature in referring to the meeting of the rails site down through the years that has persisted to the present. Promontory Summit, Promontory Point, and Promontory all have been used in varying degree. I was surprised to note that nearly all contemporary accounts speaking of the place refer to it as "Promontory Point." It seems desirable to me that this usage not be continued, and that all future references to the meeting point of the rails be "Promontory Summit." Promontory Point is a geographical feature where the South Promontory Range ends at Great Salt Lake, approximately 30 miles south of the summit site in the saddle between the North and South Promontory Ranges. The name "Promontory," I suggest, should be limited in our future usage to mean the railroad station and town that grew up at Promontory Summit after May 10, 1869.

This study is not concerned with the details of the events that took place in the ceremony on May 10, 1869 at Promontory Summit. Perhaps the best account thus far produced on that subject is in J. N. Bowman's two articles, entitled, "Driving the Last Spike at Promontory, 1869," that appeared in the California Historical Society Quarterly, Vol. XXXVI, Nos. 2 & 3, June and Sept., 1957. Also see Utley, previously cited.