ENDNOTES

1. Photo albums are denoted as follows: Colter (1952) -- images of the 1919 preliminary survey contained in an album donated by Mary Jane Colter to GCNP in 1952. When and by what means she acquired this album is not known; Ryan (1919) -- album containing photos taken by Robert Ryan, George Davol, and others; Spamer (2000) -- album containing images of the 1919 survey and acquired through an e-Bay auction by Earle Spamer in 2000. Original source of this album is unknown; Thoden (1919) -- images of 1919 survey, along with some tourist post cards, advertisements, etc. Donated to GCNP in 1989 by Thoden's nephew, Karl Tollefson. Thoden (1977) -- an 18-page letter to NPS Ranger Tim Manns, March 1977 (to date, the best single source of information on daily activities of survey party).


3. Ibid, p. 207; An interesting side note -- George Davol is listed in both the 1901 and 1915 City Directories for San Francisco as a mechanical engineer. The first listing has him employed by the Hercules Gas Eng. Works, and the second shows him established on Market Street (see Web sites http://www.sfo.com and http://www.vitalsearch-ca.com).


5. Shankland (1951, p. 207); Anderson (2000, p. 10).


10. Santa Fe Railroad (1919); Shankland (1951); Thoden (1977).

11. Santa Fe Railroad (1919). This is a photograph of a 1903-1906 version of the Bright Angel Quadrangle, upon which several proposed aerial tramway alignments were marked. Refer to Figure 1.

12. Thoden (1977); USDI (1961) -- Thoden’s map was sketched onto a 1927 reprint of the 1906 edition of the Bright Angel Quadrangle. The 1961 issue is technically identical to the earlier editions, with only minor editorial revisions. Refer to Figure 2.

13. This figure is based on Thoden’s map, as overlain on the 1961 reprint. Table 1 gives an estimate overall tramway distance, and individual span lengths for those segments shown or inferred from the Thoden map. Span lengths derived from figures given in Shankland’s book are correlated to inferred segments on Thoden’s map, and may not in fact refer to actual segments Shankland had in mind as these are not known. It would appear that Shankland’s figures cover only about one-half of the total cross-Canyon distance, or perhaps only that portion of the entire route that was surveyed by Davol’s men during 1919.


17. Richmond (1996, p. 3); Chesher (1996, p. 12 -- main cable of the “Bat Tram”, near Quartermaster Point, was some 10,000 feet long!); Cook & Schafer (1994, p. 19); Reed (1951); Muench (1951). Numerous photos in the GCNPMC archives depict these various tramways. Refer specifically to images #2649-2652 (Marble Canyon Damsite cableway); #11236-11296 (Indian Garden “Pipeline Tram”); #13534-13538, and others (Hermit Camp-Pima Point tram); #14821-14825 & 14878-14895 (U.S. Guano Tram). Photos of these trams, as well as the 1928 Union Pacific cableway from the North Rim down to Roaring Springs, can be found in the Santa Fe Railroad Water Supply Photo Collection, Arizona Historical Society (AHS Collection #856, CLSC).


19. Langdon (1977) -- Note from Mary Langdon to Tim Manns, dated January 7, 1977 (relating data given her by Harvey Butchart). This information probably came from Jim Haggart or Scott Kronberg, who had been along the Redwall rim below Tower of Set enroute to a January 3, 1977 ascent of Horus Temple (Haggart, 2000).


21. Thoden (1977). This letter forms the basis for anecdotal commentary on daily routines of the 1919 surveyors, and corroborates photo captions included in the Ryan album. This letter is reproduced in Appendix A.

22. Ohlman (1978b). This masonry structure was at first assumed to be a storage cyst, but review of photos in Thoden’s album indicates it to be a fireplace (q.v. page 15, lower left-hand photo in Thoden’s album).


THE PHOTOGRAPHS


27. Ibid, inside front cover. Bryant note is also contained on accession card #861 & GRCA Document #13638. Consulting with Colter herself could easily have rectified the several errors on this note, as she was active in Grand Canyon affairs until her death in 1958. See Grattan (1995) & Leavengood (1999, pp. 32-45) for biographical information on Mary Jane Colter.


29. GRCA Documents #49242, 49245, and 49252 (GCNPMC).


31. The Spamer album contains all but one (#177) of these 54 images, while the Ryan album contains 27 of the images, including #177.

32. Ryan album is housed at NAU Cline Library (Photo album NAU. PH97.13). Notes on Ryan album by David F. Myrick on November 29, 1995 (included with other related documents in “Tramway Folder” at GCNPMC (Accession Folder #4082). The title page of the Ryan album records the names of the men on the survey. Davol is listed as Head Engineer, Willey is Field Engineer, Schliemen is a Santa Fe representative (and one of the survey’s photographers), and Ryan is listed as “Instrument Man”.

34. Ryan (1919), photo #33 (NAU PH97.13.11). See also unnumbered photo (NAU PH97.13.7) and caption.

35. Ibid, photo #43 (NAU PH97.13.22).

36. Ryan photos #45½ (NAU PH97.13.16), #44 (NAU PH97.13.21) and also unnumbered photos (NAU PH97.13.102-107).

37. Annerino (1986, pp. 93-95, 318). Dave Ganci and Rick Tidrick ascended Zoroaster Temple on September 11, 1958. Perhaps forty-one years to the day after Ryan and “Slim” Betts reached the summit of Dana Butte (see Ryan photo #44 (NAU PH97.13.21)). “Technical” refers to the use of ropes and other climbing equipment as necessary safety precautions. The term may also include use of ladders, piled rocks, or throwing a rope up and over a tree as means to ascend a rock wall.

38. Ryan photos #54 (NAU PH97.13.17), #50 (NAU PH97.13.24), #71 (NAU PH97.13.19), and #76 (NAU PH97.13.18); also Spamer photos #50-53, 63, 70, and #76-88.

39. Ryan photos #146 (NAU PH97.13.30); Colter photo #148 (enlarged print); Spamer photos #102-103, 146 and #148. Lower end of tram is not shown in any photo. Thoden (1977, p. 3) states that this tram extended from the Tonto Plateau down to the River. Photos included in the Ryan and Spamer albums depict a tram extending clear across the Colorado River, from top of the Tonto Plateau on the south side to top of the Vishnu knoll on the north side. Ayers (1995, pp. 3 & 8) -- regarding photo #148 in Colter and Spamer albums. Ayers thinks that the cross-River tram may have been an early prototype, later replaced by two high-angle trams and a cable crossing of the River (Figure 5).

40. Thoden (1977, sketch maps of trams and access trails). When plotted on a 1906 Bright Angel Quadrangle map, Thoden’s routes appear to be rather rugged, and access to the River below the South Tonto supply tram seems circuitous, if not counter-intuitive.

41. Refer to Ryan photo #106 (NAU PH97.13.35) and unnumbered photos (NAU PH97.13.110-111); Spamer photo #106; Thoden photos on page 14. See also Spamer photo #147 for view of Tapeats tower near the South Tonto supply tram.

42. Ayers (1995, pp. 3 & 8); Ryan photos #136 & #137 (NAU PH97.13.39 & 41); Spamer photos #136-139.

43. Spamer photos #109-112 show ravines on south side of the River; Spamer photo #123 and Ryan photo #124 (NAU PH97.13.47) shows ravine on north side of the River. Thoden (1977, p. 6) describes this entire process.

44. Thoden (1977, p. 6); Spamer photos #151-157 & 180; Ryan photo #180 (NAU PH97.13.65) and unnumbered photos (NAU PH97.13.135-138 & 146). No tents are shown at this camp, perhaps indicating it was a temporary staging area or supply point, and that travel went from camps on the south Tonto to the north Redwall with only a stopover at the River enroute. On Figure 6 this site would be near “Tower #2”.

45. Thoden photos (page 3, lower right, and page 4, lower left); Ayers (1996, p. 7). Oddly, there do not appear to be any photos of the upper Redwall tram terminal, but it would have been similar to one shown in Spamer photo #62 or Thoden photo on page 4 (upper left photo).

46. Thoden (1977, p. 6).

47. Spamer photos #96, 172 & 174; Butchart photo #6755 (CLSC); Ryan photo NAU PH97.13.160 (see also NAU PH97.13.87). Haggart (2000) wrote me about his climb of Horus Temple, and mentioned that he and his partner, Scott Kronberg, ascended the Redwall along a ridge that extends east below Tower of Set. The topographic maps show two ridges that fit this description, but most likely the southeastern ridge is intended, and this is the one used by the 1919 surveyors. It is almost certain that the two burros were brought up to the Redwall rim below Tower of Set via this Redwall ravine. The only other feasible route would have been up Trinity Creek to the Shiva-Isis saddle, and then along an extremely tedious traverse of the Redwall rim below Shiva, Osiris and Horus before reaching their camp. There is no photo documentation of this in any of the four albums, nor mention of such an experience in Ryan’s photo captions or Thoden’s narrative. Both Butchart (1977a) and Ayers (1966, p. 6) mention evidence of trail construction near the upper end of the Redwall ravine -- construction that would have been unnecessary if only the men used this ravine.

48. Spamer photos #189, 196-200, 235 & 236; Ryan photos NAU PH97.13.139-142, 158, & 68 (c.f. photos on pp. 16-17 of the Thoden album).

49. Thoden (1977, pp. 7-8).

50. Butchart (1998, p. 44). Butchart also mentions this stock trail in an earlier guidebook by that same title, and there notes that E.D. McKee wrote a story about “the last roundup” of a lone steer in upper Phantom Canyon. I haven’t located McKee’s story, but in November 1985 I hiked the entire trail from Phantom Creek to Bright Angel Creek, and all of it was then still passable to livestock. Butchart (1973) reveals that Otis “Dock” Marston once provided him with a copy of an old map showing the Phantom-Bright Angel stock trail (this map should be in the Butchart Collection at NAU, CLSC).


52. Thoden (1977, pp. 7-8, 17).

53. Colter photo #204 (also in Spamer album); Ayers (1995, p. 11); Ayers (1996, p. 8).

54. Spamer photo #237 (view of Claude Birdseye Point from its saddle with Osiris Temple) appears to be the last photo taken by the survey (or at least, the last one represented in these albums). No snow appears in photo #237, but photos #219-222 do show snow.

55. Thoden (1977, pp. 14-15). Only a very few of these photos are included in the Ryan and Spamer albums, and it would be interesting to see those taken southward from the north Redwall camp.

56. Spamer (2000). Additional digital copies of this album reside at GCNPMC and in the author’s personal archives.


59. Thoden (1919). Thoden died on April 27, 1988 at the age of 87 (information taken from the Internet at http://www.ancestry.com -- Social Security Death Index data for Edward K. Thoden). His photo album was donated to GCNPMC in late 1989 (GRCA Catalog #34654), but apparently no serious study of his album has ever been made. Interest in the 1919 survey in general waited until late 1995, a full seven years after Thoden could have been available to answer specific questions regarding the survey, and the photographs. It is interesting to note that in 1919, Thoden would have been 18 years old, and perhaps the youngest member of the survey party. It is doubtful that any of the other survey members are yet living (they’d be at least 100), but it is hoped that their
relatives or descendants will yet be contacted. Ideally, a diary or journal will someday surface…

60. Swain (1970) uses the name “Davol” in his book, but has the name spelled “Devol” in his index.

61. Ohlman (1995). Photos were taken of all south Tonto supply tram and camp artifacts, and these are now in the possession of Daniel Hartley of Tucson, Arizona.

62. Ohlman (1978b, 1994a). The true purpose of this structure was not clear until October 2001, indicating that sometimes even the obvious is not always so obvious!

63. Refer to Shankland (1951), Colter (1952), Swain (1970), and Butchart (1973).

64. Thoden (1977). Appendix A is a typescript copy of this letter.


67. Refer to GRCA File Folder #4082 (GCNPMC).

68. Chesher (1996); Richmond (1996). An earlier article appeared in Arizona Highways (Cook and Schafer, 1994), but material contained therein seems to have been derived entirely from the Shankland and Swain books.

69. Refer to GRCA Document #34654 (GCNPMC).

70. (See note #59, above).

SITE INVESTIGATIONS

71. Bryant was acting Superintendent at GCNP in 1939-1940 and later full-time from 1941-1954, making him the longest-serving Superintendent in Grand Canyon history (Anderson, 2000, p. 90). It is therefore odd that he should not have been aware of the 1919 survey. William H. Peters was acting Superintendent during the 1919 survey (August 1919 - September, 1920), and the Indian Garden Pipeline tramway was built during M. R. Tillotson’s term in office (April 1927 - December 1938).


73. Butchart (1977a). According to Harvey’s hiking log, Tim Manns introduced him to Thoden’s letter while Harvey was waiting for a hiking permit at the Backcountry Office window.


75. Ohlman (1978b).


77. Thoden (1919, pp. 15 & 17). See also Appendix A.

78. Ohlman (1978a). This trip started down Dan Hogan’s “Hummingbird Trail” to the base of the Coconino. Ropes were needed to descend through the Supai and on to the Redwall rim, south of Dana Butte. Once at the south side of the Redwall saddle, it was decided not to cross over to Dana Butte as the saddle looked rather grim.

79. Ryan photos NAU PH97.13.16-19 & 21; Spamer photos #45-63. In 1994 we looked back across the southern saddle on Dana Butte, from its Redwall rim. With binoculars we could spot nothing but rocks and plants…no ladders, ropes or other evidence of human activity.


81. Grubbs (1977); Bain (1991); Thoden (1979, pp. 1-4 and attached map). See also Appendix A and modern rendition of the Thoden map (Figure 3).

82. Refer to Spamer photo #154 and Thoden photo on page 4 (lower right-hand photo).


84. Ayers (1996). To date, the single best reconnaissance made on survey sites north of the Colorado River.

85. Ibid, pp. 1-2; c.f. Spamer photos #94-98.

86. Ibid, p. 3.

87. Ibid, pp. 4-8.


89. Ayers (1996, p. 6). A note about these oilcans… Thoden consistently refers to these as “10 gallon oil cans”, and gives their dimensions as “…10”x10” and about 18” or 20” high.” (Ibid, p. 5). Butchart (1973; 1977a) likewise, consistently calls them 5-gallon cans. A square container of the size Thoden refers to would hold between 7.5 and 9 gallons. If the can’s dimensions were increased a bit to 12”x12” by 18” high, it would contain about 11¼ gallons.


92. Ibid, p. 7 -- This is rather amazing when you consider this tram site is located on an exposed cliff-edge that faces southward, toward the summer sun.


94. Both Spamer photo #150 and Ryan photo NAU PH97.13.125 show this type of pulley in use at the Vishnu knoll tram.


96. Ibid, pp. 8-9; Thoden (1977, p.13).

97. Thoden (1977, pp. 13-14); Ryan (1919, title page).