



The Ol' Pioneer

The Magazine of the Grand Canyon Historical Society

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The Historical Society was established in July 1984 as a non-profit corporation to develop and promote appreciation, understanding and education of the earlier history of the inhabitants and important events of the Grand Canyon.

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Editor: Mary Williams

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Submissions to *The Bulletin* should be sent to Karen Greig, kgreig@yahoo.com

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Spring is upon us—a time of renewal and rejuvenation. We thank all of our members who have signed on again for another year of membership in the Grand Canyon Historical Society. We have learned that our members like to continue supporting the Society, but sometimes just forget to renew—that is, until they receive a personal notice by e-mail from our membership coordinator about their lapsing membership. With a gentle nod, they are more than willing to renew for another year. With this in mind, by the time you renew for 2016, we will likely have in place an option to renew for multiple years at one time. (In case you are wondering, this will **not** be an option for a lifetime membership of any kind. These have been found to be a bad deal for non-profits. It's just a way to pay for 3 or 5 years at one time and not have to be reminded so often).

I have been busy getting the word out about our wonderful organization. In March I attended the Guides Training Seminar (GTS) held annually at Cliff Dwellers near Lees Ferry for Grand Canyon river guides. I gave a five-minute slide presentation to 225 river guides and friends of the river community about the many activities of the GCHS—our research scholarship, the Symposiums, the *Ol' Pioneer*, and our field trips. I handed out almost 200 copies of the *Ol' Pioneer* and in the process we garnered some 10 to 12 new members. Thank you one and all for your new or continued support!

In this issue of the *Ol' Pioneer*, we are running an article written by member Jim Ohlman entitled, "The 1919 Transcanyon Aerial Tramway Survey." The article is taken from our 1st Symposium volume and tells the story about when the Grand Canyon almost saw a tramway built across it from the South Rim to the North Rim. Our Editorial Committee thought this would be a timely subject to revisit, since the canyon now faces a modern and more serious threat in the guise of a developer's proposal to build an aerial tramway down to the junction of the Colorado and Little Colorado rivers. I intentionally pen the words "threat" and "guise" (dict.: deceptive, outward appearance), as the proposal fairly well fits the moniker "wrong idea at the wrong place." Our Society has in the past stayed away from controversial issues or taking sides in a proposed management decision at the Park. But the idea of a tramway at this particular place, if it should ever see the light of day, would be a travesty on so many levels for the Grand Canyon.

An informal survey of our Board members found unanimous consensus that GCHS should stand in opposition to this ill-conceived plan. (A more formal declaration may soon be issued from the Board). When we think of past tramway ideas or dams in the Grand Canyon, there is virtually no one who pines for those ill-conceived ideas nowadays. This proposal we hope will meet much the same fate. But if we are to be successful in seeing that this development never happens, our Society has a voice in showing how these kinds of developments have been opposed and defeated before. We know our history and so are not doomed to repeat it. We have nothing against infrastructure development per se but Grand Canyon stands as a monument against the "amusements and contraptions" that once caused Stephen Mather to oppose the 1919 tramway. We stand by his vision for Grand Canyon National Park.

Wayne Ranney
GCHS President

Cover: North end of cross river tram. GCNP Museum Collection

The 1919 Trans-Canyon Aerial Tramway Survey

As with the plan to build an aqueduct from the San Francisco Peaks to the South Rim and attempts to build a road to Supai, one of the little-known schemes surrounding canyon development—the idea to string a transcanyon aerial tramway to “enrich” the tourism experience—happily expired before getting far off the ground. But, as Ohlman illustrates, originators of this particular idea were serious, had all the backing required initially, and performed most of the preliminary survey before National Park Service Director Stephen T. Mather stepped in to quash the project.

.....

by Jim Ohlman

Portions of this article were previously published by Grand Canyon Association in the “2005 Grand Canyon History Symposium Monograph, Volume 1.”

It may be hard for us to imagine taking a “scenic ride” across the vast expanse of our Grand Canyon in a tiny ski-lift like gondola while suspended some two thousand or more feet above the landscape, but this is precisely what George Davol and his band of surveyors had in mind back in 1919. Their idea was simple ... at least on paper. Connect the South Rim and the North Rim with a series of suspended cables, linked one to the other by massive steel towers. Run a pulley-like device along the cables and attach a tram carriage, or gondola, beneath the pulley, and *viola*—the perfect way to view the wonders of Grand Canyon! The principle is sound, as evidenced by hundreds of alpine ski lifts around the world, as well as by such well-known aerial tramways as those at Mt. San Jacinto in southern California, and at the Sandia Mountains near Albuquerque, New Mexico. But ideas drawn on paper, and principles proved effective elsewhere ran head-on into reality at Grand Canyon. Yet it wasn't some insurmountable engineering obstacle, lack of timely funding, or even a dearth of public interest that stalled this project; its demise hinged on the politics of conservation versus public use—a theme revisited often during the recent administrative history of Grand Canyon National Park. That the two rims yet remain unconnected is obvious to even the most casual visitor. But what is not obvious

are the remnants of old camps and survey outposts, littered with rusted cans, two-by fours, and rotted rope -- relics of a preliminary survey adventure that really did take place, and of several small-scale supply trams that actually were constructed.

Little in the way of historical documentation for either the overall project or its preliminary survey has thus far surfaced. That we know anything at all about this survey comes largely from four photo albums (one discovered as recently as 2000) and one letter written by a member of the survey party some fifty-eight years after the fact.¹ But tantalizing historical tidbits are recorded for us in two books. In 1951, Robert Shankland wrote an engaging biography of Steven T. Mather, first Director of the National Park Service, and one of the men directly responsible for bringing National Park status to Grand Canyon.² According to Shankland, George K. Davol, a San Francisco engineer, approached the Santa Fe railroad as early as 1916 with his idea of uniting the two sides of Grand Canyon, and received their backing for a preliminary survey.³ It will be recalled that at this time the Santa Fe controlled not only the passenger and freight service along the Grand Canyon Railroad, but also most of the concessionaire activity at the South Rim. In their eyes, linking the two rims would broaden their influence at Grand Canyon (by providing an additional “amusement” with which to draw in tourists), and at the same time slap a glove in the face of the Union Pacific Railroad which was actively trying to establish a presence in the budding tourist business at the North Rim.⁴ With the Santa

Fe on his side Davol next directed his attention to Washington, and by May 1919 was ready to present his case to Stephen Mather, first Director of the newly established National Park Service.⁵ Mather, however, was busily engaged in field activities, so his protégé at the Department of the Interior, Horace Albright, received Davol's attention. Albright held a dim view of any commercial future for the “aeroplane” at Grand Canyon, and thus warmly embraced the idea of a cross-Canyon tram. He was even able to sign on support from Interior Secretary, Franklin Lane, Francis Farquhar, and notables at the National Museum.⁶ Once Mather had time to study the proposal, however, he voiced strong opposition to Davol's plan. To him the notion of tying-up “the two rims of this sublime prodigy of nature with wire ropes would be nothing less than monstrous”, but Davol did not receive an official refusal until October 1920 when John Barton Payne replaced Lane as Secretary of the Interior.⁷

Donald Swain's 1970 biography of Horace Albright paints pretty much the same picture of the situation, but adds the observation that this was one of the rare occasions when Albright's impulses as an administrator and conservationist ran counter to Mather's. Whereas Albright's early leanings went toward allowing the public unrestricted access to our National Parks, under the tutelage of the elder Mather he came to view the need to maintain our parks in near mint condition as more important.⁸ But between his first trip to Washington in early 1919, and the government's final “no” on the subject in late 1920, Mr. Davol was able to muster a

survey team, assemble provisions and supplies, and complete over one-half of a preliminary ground survey...all in full sight of Park Service personnel, using Santa Fe resources, and Fred Harvey mule service!⁹

Information derived from a variety of sources indicates the Santa Fe Railroad entertained several possible alignments for the Cross-Canyon aerial tram¹⁰. One map shows proposed South Rim terminals at Yavapai Point, El Tovar Hotel, Bright Angel Trailhead, and Maricopa Point (Figure 1).¹¹ Three of these alignments continue to a tower atop The Battleship, and from there to another tower on Dana Butte. The fourth alignment passes directly from the Rim out to Dana Butte. At least four continuations were considered for the next tram segment, north of Dana Butte, but all eventually end at a tower atop Tower of Set (a spectacular 6012-foot red rock butte, located 1-½ miles north of the Colorado River). Another map shows the South Rim terminal at Hopi Point, and the tram line extends north to Tower of Set, with three intermediate towers between those two endpoints.¹² Continuing north from Set, all of the proposed alignments cross the summits of Horus, Osiris and Shiva Temples before terminating at Tiyo Point on the North Rim, some twelve miles west of Bright Angel Point. Total length of the shortest alignment would have been ten miles (Table 1).¹³

Preliminary survey work was conducted during August–November, 1919 by George Davol and a team of some twelve surveyors and packers.¹⁴ Whether Davol received local approval for this work is not known, but it appears Park officials at the Canyon didn't mind. The Grand Canyon Railway brought in supplies by rail, and Fred Harvey mules transported them to camps south of the River. Survey work proceeded from the South Rim down to a point north of Dana Butte on the south side of the River. A cable-ferry was established about midway between Trinity Creek and Salt Creek allowing direct, if not easy, access to points north of the River. The survey then continued northward to the

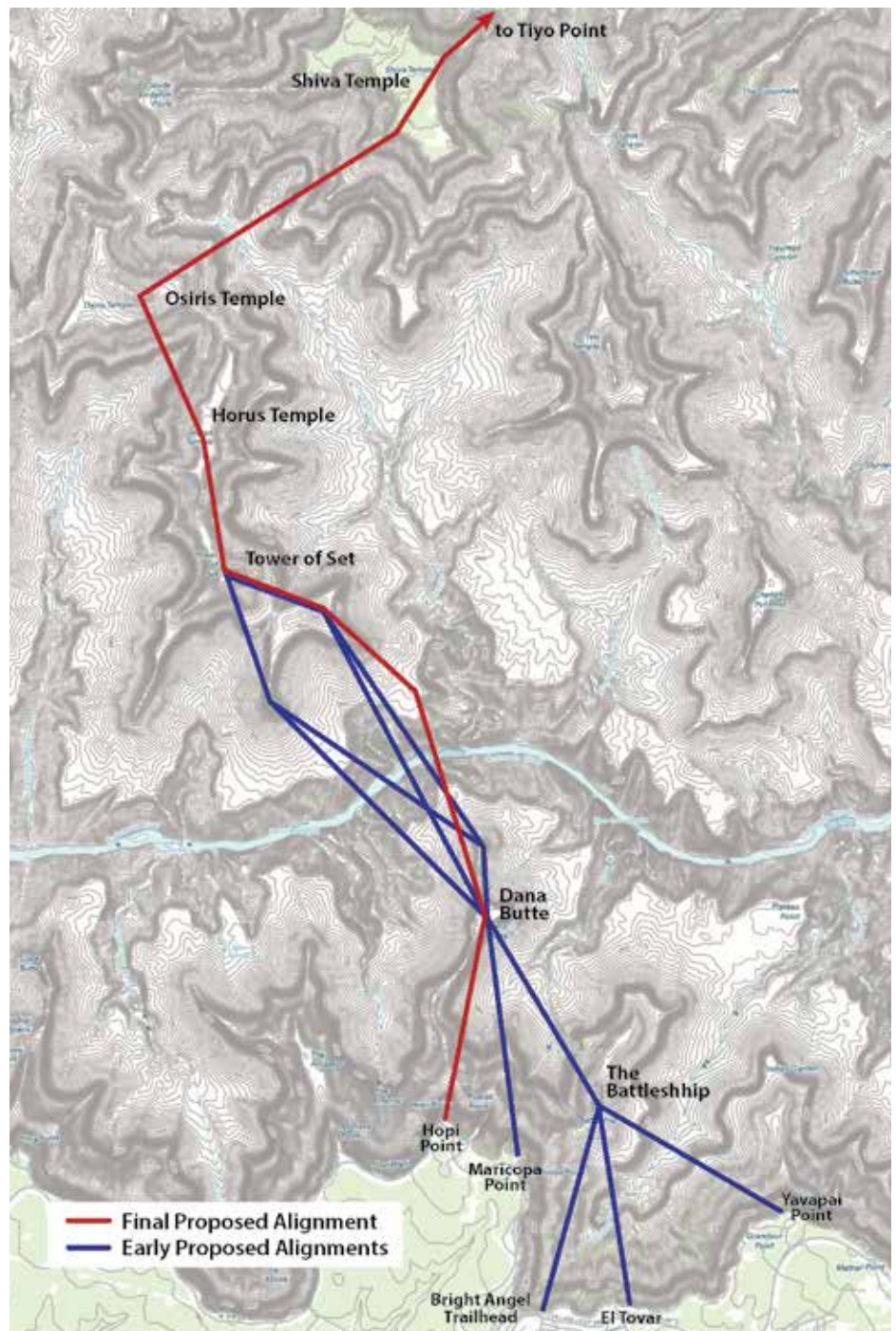


Figure 1. Various alignments considered for the tramway. *Illustration by Mary Williams*

top of the Redwall rim along the east side of Tower of Set. Camps were established at several places along this route, and lightweight “supply trams” were rigged at critical points to ease delivery of needed materials. As the survey neared the east side of Horus Temple several severe snowstorms interrupted the survey, and it was decided to curtail further work until the following year. Before packing up, Davol

and two of his men retraced the entire survey line to photo-document work completed to that point.¹⁵

Davol no doubt anticipated returning to the Canyon in 1920 to complete his survey, but Park officials had other plans for Grand Canyon, and an aerial tramway was not among them. Mather’s notion of a Park free of “amusements” and “contraptions” held sway, so Davol moved onto oth-

er projects.¹⁶ It seems amazing that no subsequent attempts were made during the 1920s and 1930s, when shorter but similar aerial trams were built down to Hermit Camp and Indian Garden, or during the 1950s and 1960s when much longer trams were constructed in Marble Canyon and the far Western Grand Canyon.¹⁷ Perhaps it is fortunate that Davol's plans for a Cross-Canyon tram were never realized, as there is no telling how many of Albright's "aeroplanes" would have met untimely ends by plowing into unseen tram cables!

Well, a couple of obscure literary references and perhaps some rapidly fading memories of the few remaining old-timers, and that should have closed the book on this historical blip. However, in 1973, the renowned Canyon explorer Harvey Butchart came across an old square-type oilcan lying on the Tonto Platform to the west of Trinity Creek (north side of the Colorado River).¹⁸ At the time this singular artifact meant little, but it piqued his interest in how it came to be there. He eventually located the Shankland and Swain references, and word got out to the Canyon hiking and climbing community. Early in 1977, climbers bent on conquering Horus Temple stumbled across a piece of old rope and some "camping trash" along the top of the Redwall, east of that butte.¹⁹ By

the end of the year additional camp debris had been spotted at the Redwall level northeast of Tower of Set, southwest of knoll 5290, and along the Tonto rim northwest of Dana Butte on the south side of the River.²⁰ In that same year (and through a fortuitous sequence of events) Ranger Tim Manns, entered into correspondence with Mr. Ed. Thoden, a member of the 1919 survey. Thoden's 18-page first-hand account of his stint as a "camp rustler" for the survey party is not only interesting reading, but also it served as an impetus for latter-day explorers to search for additional remnants of this survey's presence in the Canyon.²¹ (See Appendix A) In 1978, climbers scaling the north butte of Dana Butte discovered another rope fragment, and atop the butte itself found an odd masonry structure.²² There followed a sixteen-year "dry" period wherein interest in such historical archaeology waned, but in 1995 and 1996 a number of important discoveries were made on both sides of the Colorado River, and at several formational levels within Grand Canyon.²³ During the winter of 1995-96, Ranger Lon Ayers spent considerable time searching the Redwall rim to the south and east of Tower of Set, and also the Tonto Platform on both sides of the River (between Ninety-four Mile Canyon and Trinity Creek



Tram remains on top of the Tapeats on the south side of the river. Photo by Jim Ohlman

on the north side, and between Horn Creek and the nameless canyon east of Salt Creek on the south side).²⁴ He located the 1919 campsites along the Tonto rim on both sides of the Inner Gorge, and along the Redwall below knoll 5290. His investigation uncovered more artifacts than had previously been known, and it seems that little exploration remains to be done, save for visiting the lower terminus of the north Tonto supply tram, and the lower end of the north Redwall supply tram.²⁵

THE PHOTOGRAPHS

Colter Album

Mary Jane Colter donated the first of the four known photo albums to GCNP in April 1952. This album now resides in the Museum Study Collection, and consists of 54 mounted photographs prepared for the Santa Fe Railroad to "show views that might be available to passengers if a tramway were built into Grand Canyon."²⁶ This information is given on the inside front cover of the album in a brief explanatory note written by then Park Superintendent H. C. Bryant. Bryant is correct in stating the foregoing, but he continues, "most of these photos were taken from the tramway built and used during construction of the water supply from Indian Garden,

Trans-Canyon Aerial Tramway				
PROPOSED TRAMWAY SEGMENT	USGS Topographic Map (1988)		Shankland (1951)	
	SPAN LENGTH		SPAN LENGTH	
	Miles	Feet	Miles	Feet
El Tovar-Battleship	1.23	649	--	--
Battleship-Dana Butte	1.27	6706	--	--
Hopi Point-Dana Butte	1.21	6389	1.19	6300
Dana Butte-Little Dana Butte	0.43	2270	.038	2000
Little Dana Butte-Knoll 5290	1.70	8976	--	--
Little Dana-N. Tonto	--	--	1.23	6500
N. Tonto-Tower of Set	--	--	1.44	7600
Knoll 5290-Tower of Set	0.58	3062	--	--
Tower of Set-Horus Temple	1/16	6125	--	--
Horus Temple-Osiris Temple	0.72	3802	--	--
Osiris Temple-Shiva Temple (1st tower)	1.53	8078	--	--
Shiva Temple (1st tower to 2nd tower)	.88	4646	--	--
Shiva Temple (2nd tower-Tiyo Point)	1.84	9715	--	--
	10.05	53064	4.24	22400

Table 1.

completed in 1928.²⁷ There are two obvious errors here, as all of the included photographs are from the 1919 survey, and the Indian Garden pipeline was built in 1931-32 rather than in 1928.²⁸ Perhaps Bryant was thinking of the water pipeline built by the Union Pacific Railroad off the North Rim to Roaring Springs. That installation also required construction of a supply tram, and the 1928 date appears reasonable as indicated by certain captioned photos in the Museum collection.²⁹ During the summer of 1995, Ranger Lon Ayers spent considerable time reviewing these photos, discerning both their subject material and possible location of each camera station.³⁰ He had assistance from both Thoden's written account, and copies of photographs recently obtained from the Ryan album (discussed below), but at that time little field reconnaissance of the survey route had been done, and the excellent sequential images of the Spamer album (also discussed below) were not available. Several interesting features of this album are worth noting. First, all of the prints measure 6¾" by 11¼", which is a rather large format for photographs placed in an album. Second, every image bears a number somewhere along its lower edge. These numbers are gap-sequential in ascending order from front to back of the album, starting from image #39 and ending with image #233 (image #90 is the only one out of order). These numbers indicate that a series of photographs was initially produced during the survey, and that this particular album contains only those images considered pertinent by its compiler for its intended use. This point will be discussed more fully later, but for the moment, it will be useful to refer to these numbered prints as the "Santa Fe" images, as the following three albums contain additional photos of a different origin. Note that all of the images in this collection are represented in either the Ryan or Spamer albums.³¹

Ryan Album

The Robert L. Ryan album is presently housed in the Special Collections

section of the Cline Library in Flagstaff, Arizona, and was donated by Ryan's son, Bob Jr., in 1996. Ryan was one of the original members of the 1919 survey team, and was next in charge of the fieldwork after L. C. Willey and E. Schliewen.³² The album contains a total of 323 images, of which 163 relate specifically to the tramway survey. Of these, 93 are of the type referred to previously as "Santa Fe" images, and 70 images are personal "snapshots" taken either by Ryan himself or by a designee. There are among the Santa Fe images at least three duplicate prints. Whereas the Colter album has images arranged in near-numerical order, the Ryan album has them arranged every-which-way, starting with image #6 (NAU PH97.13.3) and ending with image #239 (NAU PH97.13.76). There are also four unmarked "Santa Fe" photos (NAU PH97.13.7, 9, & 14-15) that likely fit into the numbering sequence between photos #2 and #38 of the Spamer album (see below). It is assumed that the numbers were "cropped" off these images during processing. One keynote feature of this album is the extensive captioning provided by Ryan. Nearly every page is annotated in some way, providing historians valuable insight into the survey effort. In fact, such a great body of information is contained within these notations that it is possible to piece together a brief chronology of the survey. The following narrative is derived from study of these images, and incorporates critical historical information contained in a letter from one of the survey members.³³

The Ryan photos comprise views taken along a survey line that extended from the "back door" of the El Tovar Hotel, down the Bright Angel Trail, and along the Supai ledges to the Battleship. A supply tram was set up between the South Rim and the top of the Battleship. Where the rim terminus of this tram was is not clear, but most likely it was at or near Maricopa Point.³⁴ Moving on from the Battleship the survey line dropped down through the Supai formation on the west side of the Battleship-Maricopa Point saddle to the top of the Red-



North Tower and the Saddle. Dana Butte is an approximate rectangle with vertical cliffs 500 feet high, accessible only by the North and South Saddles which call for some steep climbing. *Spamer Collection*

wall, and along a traverse atop the Redwall to the saddle south of Dana Butte. Ryan indicates a "rope way" was used to get down off the Supai to the top of the Redwall below the Battleship, but it is not clear whether this constituted a supply tram or not.³⁵ Ropes and ladders were used in getting across the Redwall saddle and onto Dana Butte itself.³⁶ This is the first recorded ascent of Dana Butte, and is perhaps the first technical ascent of any summit in Grand Canyon, predating the Ganci-Tidrick ascent of Zoroaster Temple by forty-one years.³⁷ The survey line then dropped off the north end of Dana Butte to the saddle between that butte and the outlying knoll, termed the "North Tower" by Ryan, but here referred to as "Little Dana Butte".³⁸ A supply tram was set up from the south end of this saddle down to the Tonto on the east. Once on the Tonto Platform, Fred Harvey Company mule trains along the West Tonto Trail out of Indian Garden supplied the survey crew.

At the point where "Epsom Creek"



A raft attached to a crossing rope by pulley. The current did the 'heavy' work. [View toward the south side of the river. Twenty or more oil cans provided buoyancy for the raft.] *GCNP Museum Collection.*



Original boat to be used for crossing river. This boat was lost in the river by Mr. Davol and Mr. Kolb, who had an exciting escape. [South side of river, looking up canyon.] *GCNP Museum Collection.*

(an unnamed drainage parallel to and immediately east of Salt Creek) and the Colorado River meet, a supply tram was established, extending off the Tonto through the Tapeats ledges down to the river.³⁹ Access to the lower terminus of this tram was initially via a scramble down a small ravine in the Tapeats rim (well to the south of the tram) and then along a diagonal route through the Vishnu Schist to the River.⁴⁰ Later a simple rope ladder was rigged from the Tapeats rim down to a small saddle formed between it and a detached tower to the west.⁴¹ Once at the River a raft was constructed of rectangular, 10-gallon metal cans and scrap lumber. Cables were stretched across the river and a ferry service of sorts was established. Ascending to the north out of the Inner Gorge, the men set up a fourth supply tram, the upper terminus of which was near the top of a flat-topped knoll in the Vishnu Schist. At some point in time, a cross-River tram was constructed between the upper terminus of the south Tonto tram, and the upper terminus of this Inner Gorge tram on the north side of the River. This tram did not work out very well, it seems, as Ed. Thoden (a late addition to the survey party) recalls using only the raft at the river as the means of transporting materials across from south to north.⁴² Steep ravines in the Inner Gorge provided access between the tram terminals and the river ferry, and although the men

moved their supplies on these trams, they were forced to move themselves along the ravines.⁴³ A fifth supply tram was constructed from the top of the Vishnu knoll up to the north Tonto Platform, and another temporary camp was established.⁴⁴ Work then progressed to the top of the Redwall rim at a point south and east of the knoll marked 5290 on recent topographic maps (shown as 5296 on the older Matthes-Evans topographic maps), where a sixth supply tram was constructed.⁴⁵ It is not clear how this point was first approached. Thoden discusses following a steep and exposed route through the Redwall, along a line nearly parallel to that which passes between the upper terminus of the north Tonto tram and the knoll.⁴⁶ The Redwall ridge that extends to the east from knoll 5290 appears to be climbable, but it is certainly not the easiest route through the Redwall. Although Thoden does not discuss any routes other than the steep climb in the vicinity of the Redwall tram, Ryan took pictures of an easier ascent ravine to the west of the Tower of Set – knoll 5290 saddle, and it is possible that this ravine was used first in reaching the top of the Redwall rim.⁴⁷ Thoden's steep climbing route might have been used later because of its proximity to the Redwall tram, but perhaps only after someone coming down from above set fixed ropes and rope ladders along the route.

An interesting interlude in Thoden's narrative is the arrival and use of two burros. Photos in both the Ryan and Spamer albums show these two creatures along the Colorado River, at the north Tonto camp, and atop the Redwall below Tower of Set.⁴⁸ Thoden relates how they were brought over to the north side via Bright Angel Creek, then up Haunted Creek, around the south end of Isis Temple and then around the head of Trinity Creek to the Tower of Set.⁴⁹ What Thoden calls Haunted Creek is most likely Phantom Creek, but even so it doesn't seem possible that any large four-legged animal could make its way past the numerous falls and deep pools in this side canyon. Thoden mentions their using a block and fall (rope hoist with wooden pulleys) to get the animals up many bad places, so there may be some truth to



Henry and the Burros. *GCNP Museum Collection.*



Moving the burros. *Spamer Collection*

this version. However, there is also an old overland stock trail that leads into the upper reach of Phantom Creek from a starting point near Ribbon Falls, and this may be the route used by the surveyors to bring in the burros.⁵⁰ Once at the north Tonto camp it would have been easy work to trail the burros westward along the Tonto to the Redwall ravine depicted by Ryan. Indeed, one photo in his album shows trail construction near the upper end of this ravine.⁵¹ According to Thoden, however, these burros were of little use to the survey crew, and he wondered what became of them after the men left the Canyon.⁵²

Base camps, complete with tents, stoves and tables were erected on the south side of the River near the top of the south Tonto tram, and on the north side, somewhat north of the top of the north Tonto tram. Other camps were established on top of Dana Butte and on the Redwall rim near the base of knoll 5290. According to one of the photos in the Colter album, at least one other camp was set up along the Redwall rim, somewhere on the east side of Tower of Set.⁵³ Survey work progressed northward across the Redwall rim, along the east sides of both Tower of Set and Horus Temple, and at least scouting trips were made as far as the Osiris Temple-Claude

Birdseye Point saddle. There are no pictures in the Ryan album to indicate that he or any of the other members of the survey crew probed as far as the Shiva-Isis saddle or beyond to the Tiyo Point-Shiva Temple saddle or up to the rim itself.⁵⁴ There are also no pictures in either the Ryan or Colter collections which indicate the surveyors attained the summits of any of the buttes or temples on the north side of the River, but it would be worthwhile looking for evidence of their presence on Set and Horus.

Sometime near Thanksgiving of 1919, the survey crew was pounded by several severe snowstorms, which effectively ended their field efforts for that year. The survey crew packed up after the storms and left for new adventures, but Davol, Thoden, and one other man returned to photo-document all of the survey line that had been completed.⁵⁵

Spamer Album

In 2000, a third photo album was discovered by Earle Spamer of the Academy of Natural Sciences (Philadelphia). The original album presently resides with Mr. Spamer, but digital copies of the included images have been graciously made available to the Cline Library in Flagstaff, and the Museum Study Collection at Grand Canyon.⁵⁶ This album contains 145 images of the 1919 survey. All are presented in strict numeric sequence (using the "Santa Fe" numbering

system), starting with #3 and ending with #240. Obviously, not every image in the entire set is represented in this album, but to date this is the most inclusive collection of photographs related to the survey that has been found. Seventy-two of the images in this collection differ from those included in either the Colter or Ryan albums, but together these three albums contain 162 out of an assumed total of at least 240 images.

Thoden Album

Along with several postcards, a clipped advertisement and the like, this scrapbook-like album contains 61 photos of the Grand Canyon, of which 48 are pertinent to the 1919 survey. It was donated to the Grand Canyon Museum Collection by one of Ed. Thoden's relatives in December, 1989.⁵⁹ While none of the included photos appear to be part of the "Santa Fe" series, what it lacks in style it makes up for in historicity, as many of the images include details of camp life that are lacking in the more formal collections discussed above.

The first page of the album contains the header strip "1919 Duval Grand Canyon Survey". Thoden used both "Duval" and "DeFoe" in his narrative, so along with the use of "Devol" elsewhere in the literature, we have at least four variations of the Davol name.

Most of the photographs in the Thoden album are personal snap-



Spamer Collection



Four men at south Tonto camp. View to northeast. Cheops Pyramid in upper center, Buddha Temple in left center. GCNP Museum Collection.

shots of friends and scenes that Thoden wanted to keep alive through the wonder of film. He was less interested in the grand scenery than in those who were in it with him. Photos in the Spamer album are documentary in nature, serving to record progress of the survey and events, rather than daily life of the surveyors. The Ryan album is a mixture of these two, wanting to record "the survey" while at the same time trying to capture "the surveyors" as well. The Colter album appears to have been a carefully selected set of official "Santa Fe" photos, either used to draw attention to highlights of the survey, or perhaps just to convey a memento of the survey to Colter by her friends at Santa Fe. Based on the style and content of photographs contained in these four albums, and on scant historical data found elsewhere, it is the view of this author that all of the numbered photographs in these albums were commissioned by (and perhaps also produced by) the Santa Fe Railroad. Each album appears to have been "individualized" to suit a particular need or use, as no one album contains the entire series of images. Indeed, these albums represent less than 70% of the known or suspected images collectively. According to Thoden, a large number of images were made after the main survey had been completed, and after all but two of the original

crew had been discharged. It appears that only a handful of these latter images were deemed suitable for inclusion in any of these albums, perhaps because of their overt documentary character. It would be most interesting if future researchers could locate these missing images, as well as the remaining numbered "Santa Fe" photographs.

THE THODEN LETTER

Prior to 1977 nearly all knowledge of the 1919 survey had been forgotten, save for one mislabeled set of photographs at the South Rim Library and two brief inserts in biographies on Stephen Mather and Horace Albright.⁶³ Physical artifacts connected with the survey were largely undiscovered, due to their remote locations, and those that were found brought quizzical looks to passing explorers because their story was unknown.

In early 1977, GCNP Ranger Tim Manns received a long, handwritten letter from Mr. Ed. Thoden, one of the packers or "camp rustlers" on the survey. This letter contains eighteen pages outlining the work that was done, along with a transcribed map of the route surveyed and a three-part sketch of a typical supply tram.⁶⁴ Several letters were exchanged between Manns and Thoden during

this year, although none contained as much pertinent information as the first.⁶⁵ Noted Canyon hiker, Harvey Butchart also contacted Thoden in April of that year with news of his discovery of survey artifacts along the Tonto, west of Trinity Creek, and atop the Redwall southeast of Tower of Set.⁶⁶ There the matter sat for some seventeen years. In August 1994, I contacted Tim Manns to see if he had any copies of his correspondence with Thoden, as the South Rim Library had preserved only the first two letters that they had exchanged. Unfortunately, only the originals at the library have been retained.⁶⁷

In 1995, the Ryan album surfaced, and several sets of duplicate prints were made from the originals. Researchers gathered around the new find and a flurry of literary activity followed, resulting in at least two articles or reprints thereof.⁶⁸ Thoden's letter formed the core of these papers, with Ryan's photographs providing the scenic backdrop. Thoden's photo album, however, somehow escaped notice during this time, although according to GCNP records it had become part of the Museum Collection in December 1989.⁶⁹ Ed. Thoden died in April 1988, so it would appear that all we have to work with are his letter and his scrapbook.⁷⁰ Due to the possible difficulty of obtaining copies of this letter, I have included a typescript version of the original handwritten letter as an appendix to this paper (Appendix A). To say this letter has become critical to our understanding of the 1919 tramway survey is certainly an overstatement, since the numerous site-specific annotations of the Ryan album could alone carry the weight of historic scrutiny. Yet without it, our knowledge and certainly our appreciation of the work these men did would be incomplete.

SITE INVESTIGATIONS

After 1919, nearly all memory of this survey had passed from the scene. The Colter photo album was donated to the Park in 1952, but it was oddly mislabeled by Superinten-

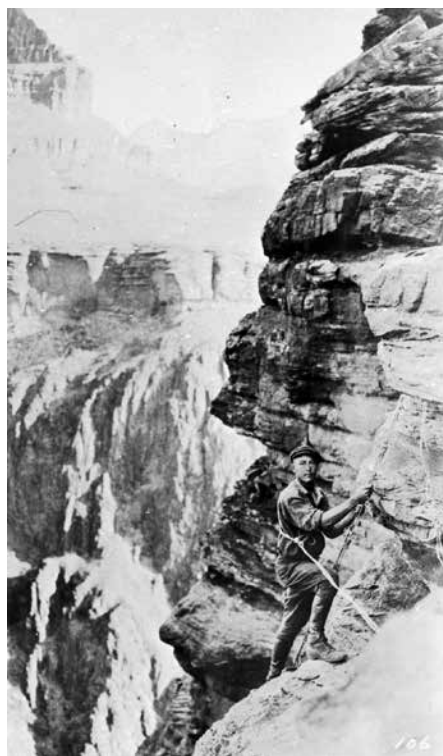
dent Bryant, and no obvious fanfare attended its arrival.⁷¹ Brief accounts of the survey appeared in 1951 and again in 1970, but they spurred little, if any, interest in further investigation. It may be that some of the "old-timers" living at the South Rim retained some knowledge of the survey, but nothing seems to have been written down or verbally passed along. Even such notable figures of early Inner Canyon exploration as the Kolb brothers, Alan McRae, and Merrill Clubb left us no record of their finding any physical artifact from this survey. It was left to Harvey Butchart to get things moving.

In March 1973, Butchart and Gerit DeGelecke hiked along the north Tonto platform, enroute from Trinity Creek to Ninety-Four Mile Canyon. As they passed below the area of the Redwall tram site, they came upon a single 5-gallon metal oilcan. At the time they had no idea how such an object could have arrived there, but later Butchart learned of the 1919 survey and made the logical connection.⁷² In April, 1977 Butchart was again in the same area, only this time he had talked with Tim Manns and had read the Thoden letter, so he knew what to look for, and where.⁷³ According to Harvey's log, he ascended the Redwall ravine southeast of Tower of Set, and found one rusted 5-gallon oilcan and some old trail construction enroute. Once on top of the Redwall rim he walked out to the end of the promontory that juts southeast from knoll 5290. Near the end of the rim he came to an old camp marked by a rectangular row of rocks (tent pad), an old rusted shovel, a metal funnel for collecting smoke above a fire, and several smooth boards.⁷⁴ Harvey's main reason for climbing to this point was to search for a natural bridge in the Redwall rim, so he did not look for additional evidence of the 1919 survey.

On May 7, 1978, a party of climbers succeeded in ascending the northern buttress of Dana Butte. At first, they assumed theirs was the first ascent of that butte, and that no other people had ever been there. Imagine their

surprise as they stumbled across a well-built fireplace near the Redwall rim of that butte, just north of the summit! As with Butchart on his 1973 trip, these climbers had no idea who had built this fireplace or even that it *was* a fireplace (that revelation came in November, 2001)⁷⁵

In May 1994, Dana Butte was re-climbed for the express purpose of



Man being belayed climbing tower below Tonto Platform. GCNP Museum Collection

obtaining photographic evidence of the material that had been seen during the 1978 ascent.⁷⁶ The piece of rope noted in 1978 was gone, but the masonry structure was still intact. Recent study of photos in the Thoden scrapbook shows that this structure was actually used as a fireplace and barbecue pit by the surveyors.⁷⁷ No other artifacts were noted either on Dana Butte or along its northern ridge, and none were spotted during a binocular scan of the southern saddle from Dana's Redwall rim. A previous scouting trip to the Redwall rim overlooking the south end of this southern saddle produced similar negative results.⁷⁸ It was concluded that all of the ropes and ladders, etc. depicted in the Ryan and Spamer

photographs were removed by the survey after their work progressed past Dana Butte and down onto the Tonto Platform.⁷⁹ It seems strange that no rusted cans or other camp trash was left atop Dana, but it is possible that all such refuse was simply tossed over the edge of the butte. A worthwhile venture would be to scout the base of the Redwall all around Dana Butte, especially on both sides of the southern saddle, the west side of the northern saddle, and below its northern face.

In April 1995, Daniel Hartley and I visited the south Tonto tram and associated campsite.⁸⁰ This site had been previously visited by Bruce Grubbs and George Bain and certainly many others over the years, and is described in part by Thoden in his narrative.⁸¹ Using Thoden's sketch map as a guide, we located their overland route to the base of the Tapeats, at a point immediately beneath the upper tram terminus. This site is in an alcove formed on the north side of the small, detached tower of Tapeats shown in Spamer's photos #105, and #147-150. A single rusted can marked their access route, but a number of artifacts were noted at the base of the Tapeats. These included a large wooden pulley, pieces of rope, rusted brass and iron fittings, and the squashed remains of one of the wooden boxes used to transport supplies along the tram.⁸² The upper tram terminus is a platform built with dry-laid blocks of local sandstone. This was used as the base of support for the tram head-frame, featured in several of Ryan's unnumbered photos.⁸³ Near this platform we found a near-complete head-frame, several of its wooden, pulley-like wheels, and some bronze axle bushings. North of the tram terminus the surveyors established a trash dump in a shallow ravine on the Tapeats rim, directly overlooking the River. Surviving artifacts there include dozens of rusted tin cans, a pie tin or two, and a two-wheel trolley similar to the one mentioned on page 3 of Thoden's narrative. We did not have time to scout the route below this tram and down to



Man climbing tower below Tonto Platform.
GCNP Museum Collection

the River, but as viewed from above there appeared to be at least three possible rope-less routes through the Vishnu. Another scouting trip will be needed to determine which, if any, of these routes was actually used by the surveyors.

During the winter of 1995-96, Ranger Lon Ayers spent considerable time searching for evidence of the Davol survey, on both sides of the Colorado River.⁸⁴ An initial day-hike out to the Battleship proved somewhat fruitless, as there was no direct evidence of the 1919 survey's presence there (in the way of names carved into the rocks near the summit, camp trash, etc.). Beneath an overhang on the east side of the summit, however, was an odd masonry wall. Although assumed to be of prehistoric origin, further study may prove it a shelter erected by the survey party (see Ryan photos NAU PH97.13.6, & 98).

Lon's next venture was to the south Tonto tram site and camp, where he saw the tent pads built by the survey team.⁸⁵ Lon also inspected the upper tram terminus and came across the same artifacts that I had seen in

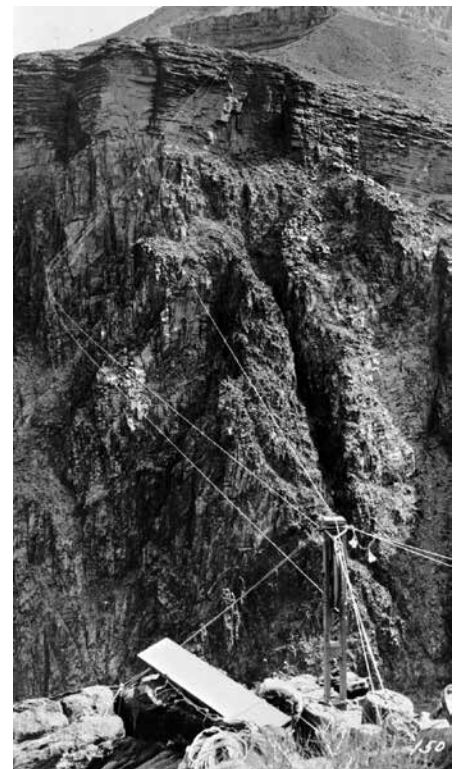
1995, but he noticed something others had passed over completely...that all of the artifacts, right down to the smallest fitting and thinnest board, were of exceptionally high quality. In his words, "everything I saw at this site seemed the product of a spare-no-expense operation carried out by competent men backed by expert leadership and moneyed support".⁸⁶ Having carefully studied several hundred photographs related to this survey, I must agree with Lon's assessment.

In March 1996, Lon found a window of opportunity in the weather, and headed over to the Trinity Creek area for several days of poking around the Redwall rim to the south and east of Tower of Set, and also the Tonto Platform west of Trinity Creek.⁸⁷ The first stop on his reconnaissance was the north Tonto camp, which he located a couple minutes west of the apex point overlooking the mouth of Trinity Creek from the west. Little remained of this camp, save for a row of stones where a tent had stood, and a few rusted cans. This scene fits in with photos present in both the Ryan and Spamer albums that show this to be a temporary supply dump from materials coming across the Inner Gorge.⁸⁸ South of the camp, Lon found traces of the upper terminal of the north Tonto tram. Stacked boulders and two stone piers, along with a small, rotting section of the wooden frame were seen, along with a sleeved bolt that appeared identical to one Lon found earlier at the south Tonto tram.

The next segment of Lon's scouting trip took him west along the Tonto Plateau and up the Redwall ravine southeast of Tower of Set. In retracing Harvey's earlier trip in this area, Lon came across the rusted 5-gallon square oilcan in the Redwall ravine, along with obvious trail construction.⁸⁹ Once atop the Redwall he walked east to the end of the promontory that projects southeast from knoll 5290. There he found the surveyor's Redwall tram camp.⁹⁰ Along with the artifacts that Harvey had seen on his 1977 trip, Lon also spotted a fire grate and a trash dump contain-

ing coffee tins and Four Roses tobacco jars.⁹¹ At the very end of the promontory he could peer down the steep, serrated Redwall ridge and spot a little pile of rocks (or cairn) just where the route vanished into the depths of the Canyon. Declining to follow the ridge route further, Lon backtracked westward and on a small ledge, just below the top of the cliff, he spotted the upper Redwall tram terminus. According to Lon, this structure was the most intact tram mechanism he had yet encountered.⁹² Remnants included a massive boom (9-10 feet in length), a large diameter wooden pulley with a steel axle, a small single wheel caged pulley, and a heavy-duty forged-frame, two-wheel trolley (a heavier version of the one I had seen in the trash dump at the south Tonto tram site in 1995).⁹³ Above the tram terminal, Lon chanced upon several bicycle wheels. These are of the semi-old-fashioned type with steel hubs and spokes, but with wooden rims.⁹⁴

With little time remaining for exploration, Lon walked north along the Redwall rim, and around to the



Cross River Tram. [View to south from north terminus of cross-river tram.] GCNP Museum Collection

northeast corner of Tower of Set. There he found the main (and last) camp of the 1919 survey party. The collection of artifacts he found at this site is too numerous to list here, but several are worth noting. Along with a rather extensive assortment of cooking and eating implements and utensils, Lon found three brass plumb bobs, a stadia rod and remains of a wooden tripod. Also a hand saw, a geologist's hammer and an ax sporting an extremely weathered handle. The most interesting find of all, however, were the pack saddles for the two burros, along with an assortment of little, never-used, burro shoes.⁹⁵ Lon realized that there were no valuable artifacts present at any of the sites he visited, and this is notable in that it conflicts with Thoden's statement that nothing was carried away from their last campsite, either at the time of initial site abandonment, or when he returned with Davol and Jimmy to photograph their work.⁹⁶ This would have included such expensive equipment as transits and levels. Lon surmises that either these items were in fact packed out by the three surveyors (but unknown or unseen by Thoden), or that Davol made a separate trip after Thoden and Jimmy had left, and reclaimed these items himself. A third possibility is that others came along well after the fact and pocketed some valuable prizes for themselves. I personally feel that Lon's first assessment is the most likely one, as professional surveyors would have regarded such tools of their trade as nearly invaluable, and especially so if they belonged to others such as Davol (very likely) or the Santa Fe Railroad (less likely), and payment was required for failure to return them!

Since 1996, there have been no site investigations of known or potential survey camps, trams, etc., that I am aware of, but several worthwhile areas deserve further exploration. Essentially nothing below the Tonto Rim has been explored. This would include the double tram site atop the Vishnu knoll, and access ravines leading down to the River on both sides. The lower terminus of the Redwall



Eddie [Schliewen?] and [George] Still. GCNP Museum Collection

supply tram should be visited, as well as a climb up along the Redwall ridge southeast of knoll 5290. The camp on Dana Butte was probably completely abandoned, but it would still be interesting to check anyway if for no other reason than the supreme view! Another intriguing search area would be along the Redwall rim, north of the final camp of the 1919 survey and around to the Osiris-Claude Birdseye Point saddle. Again, there may be little to find, but the hike should prove

scenic. Since a main objective of the survey was to locate and inspect possible anchorages for the tramway towers, it may be worthwhile examining the summits of Tower of Set and Horus Temple. Climbing parties have reported seeing no indication of human activity above the Redwall level on either of these two buttes, but I strongly suspect these intrepid surveyors would have had no difficulty scaling either summit. Perhaps time was a factor. Thoden mentions



Camp at top of Redwall, eastern base of Tower of Set. Spamer Collection

that he was with the survey party for three months, and the Ryan album indicates the survey lasted all or part of four months (August-November, 1919).⁹⁷ Since Thoden came into the survey after work had already started, and his first assignment concerned the south Tonto supply tram, it would seem that only one month was spent surveying the line between El Tovar out to the Battleship, and then from there over to and across Dana Butte and down to the Tonto Plateau. If so much ground could have been covered in the first month of the survey, it seems likely a significant amount of work could have been accomplished north of the River in the subsequent three months. Perhaps there was time to climb another Canyon temple or two? Perhaps also we will never know what was actually accomplished by this rather short-lived venture, but it is certain we will come a bit closer in finding out through continued research and further field investigation.

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APPENDIX A

The following is a typescript copy of a handwritten letter to Ranger Tim Manns (GCNP) from Mr. Ed. Thoden, a member of the 1919 Cross-Canyon Aerial Tramway Survey party. The original letter is in the Grand Canyon National Park Museum Collection. Grammar and spelling have been modified slightly to make the reading easier, but all colloquialisms present in the original are retained here.

Dear Mr. Tim Manns,

My nephew, Karl Tollefsen wrote and told me about his recent trip thru the south-west. He mentioned how he met you and how you would be interested in my little experience in the Canyon almost 60 years ago. He was mistaken about me working on the bridge.

In 1919 I did work with a surveying out-fit in the Canyon. The first bridge was put up about 1921, I believe, a suspension which swung with the breeze. Then about 1928 a rigid steel bridge was erected. In 1919

one crossed the river by cable car. The car just big enough to hold 1 mule & man. One had to pull them-selves across by rope lines.

At that time King Albert of Belgium was visiting the Canyon. He was on his way to California to see Herbert Hoover, who was at that time Food Administrator. The U.S.A. later supplied Belgium with food for their starving people. King Albert was a great M'tain climber, and a short time later was killed climbing the Alps.

This surveying out-fit consisted of a Mr. DeFoe (I might not have his name spelled right) who was the Chief Engineer—Three surveyors named Wiley, Ryan and Schliemen—a camp cook—and about 8 or 9 camp rustlers, of which I was one. The rustler's jobs were to pack supplies & water, rig up the trams (which I will go into later) and sometimes act as rodmen.

Why the survey was being done, I do not know? We did have a thought that it might be to construct a set of Tramcars, similar to ski lifts (or) sight-seeing cars like at Albuquerque, N.M. Whether Fred Harvey or the Santa Fe R.R. or the Park Service financed it, I do not know.

This was a preliminary survey. The plans were for a traverse line to be run from Hopi Pt. via Danna Butte, Tower of Set, Horus and Osiris Temples, Shiva Temple to Tiyo Point on the north rim.

While working on the south side of the river and camped around Danna Butte, it was not bad as our supplies & equipment was packed down by Harvey mules, and we got our water by mules from Indian Gardens. But working the south & north granite inner gorge it started to get tough.

First, we had to rig up a tram on the top edge of the Granite Gorge. This was on the order of a wash-line. A frame work about 6ft. high & 3ft. wide made of 2"x4" and 1"x4" pine wood, that was pre-cut, was re-assembled and put up.

One frame was set up on the top of the granite, the other one below by the river. Two lines were attached to the frames running up & down the granite. On each line ran a 2 wheel trolley

with a box attached to each. Attached to each trolley was a rope which ran around a reel at each frame. The frame was roped to rocks and rocks were piled around it to hold it up right. As no holes could be dug. (The enclosed sketch will give you a better idea than my way of explaining it.)

Food – equipment – camp supplies or what have you, would be loaded in a box, a signal would be given to the operator at the other end, as to the approximate weight, the lower operator would fill his box with stone, rock or sand weighing a little less than the upper box. The upper box would be turned loose and down it would go. The weight of the lower box coming up would slow up the speed of the upper box coming down. Of course, that was the theory. Most of the times it worked but many times there would not be enough weight in the lower box so the upper one would come down like a "streak of greased lightning" and smash things "galley west." You can imagine what it was like as you know the drop of the inner gorge.

Of course we did not ride down on this as it was not built strong enough. We would climb down a side canyon of the gorge to the river. A few of the bad spots we had 20 or 30 feet of knotted rope and a rope ladder to get us by. After arriving at the river we rigged up a frame like the above. Hooking it up with the top frame and getting it in working order, we turned our attention to crossing the river.

Tying a rope around Ryan, who was the best swimmer, he swam across the river. Some of us held him back on the rope so the current would not take him down stream. Arriving on the north side he made the line fast to boulders. On this side a pulley was attached and a rope was tied from the pulley to another fellow. He swam across carrying another rope. So now we had to lines across.

A raft was then built. This was made of empty 10 Gal oil cans, 10"x10" and about 18" or 20" high. (The West could not of got along with-out them). We must have had about 30 of them as all our water was hauled in

them. Lashing about 10 cans together with rope and then lashing narrow 1"x2" pine strips to the cans, we had a raft. It would hold two men sitting down but of course you sure got a wet bottom. Hooking the raft to the pulley running along the line, the current of the river would take one half-way across, the rest of the way was by pulling on the second rope.

In the mean-time some of us were working the new tram bringing down supplies from the Tonto Plateau to the river. Also the surveyors were taking shots and levels around the river and inner gorge. Of course this operation was not as easy as I write about it. We were at the river about a week.

After rafting the supplies across the to the north side of the river, another frame was rigged-up. Some of us climbed up the granite thru a side canyon almost opposite to the side canyon on the south side. We carried food, strips of wood, rope etc. to build a frame on the top of the granite. Of course there were many trips up & down and it took many days.

After getting that tram in operation, another was built from there up to the top of the sand-stone shelves. From there we packed on our backs the supplies up the talus to the base of the wall to the Tower of Set.

The same procedure was done, rigging up a tram as was described before. There was one bad spot while climbing this wall. We had to make an almost 90 degree turn just having a toe & finger hold and also had to step across a two foot wide crevasse. At that spot we rigged up a knotted rope to hold on to. It helped a lot but even so we all hated that wall.

In the mean time, we still had to get in supplies. About every 2 weeks a Fred Harvey packer would bring down a mule string of supplies. He'd dump them off near the Tonto Trail by our first tram. He'd put a signal flag up as we could see it with binoculars, or we knew about when he would be there. We would then toss a coin to see who would operate the 1st tram then the 2nd etc. We always traveled in pairs for safety. The ones that got stuck with the first and 2nd trams,

left a day ahead of the others as they had to go further. It was a good days trip climbing down to the river, crossing it, and then climb up the south granite. We'd bring a little food with us, coffee, beans, flour, canned meat, and a canteen of water and a blanket.

To eliminate so much back-packing while climbing, we would put our packs on the tram and as we always left rocks in the bottom box from a previous trip, would send the packs down by tram. When we got down below we'd take our packs & tie the tram so the box would not fly up again. Coming back we would put packs in the lower box and when arriving at the top adjust the weight of rocks in the upper box to bring our packs up to us.

The ones that had the nearer trams left a day later. Some times we would be there ½ a day or more before the supplies came up to our station. That was good, as we'd just lay around or explore. Eventually we would get every thing to camp. Just like running around to the Super-Market to shop for something for supper and come back three days later with the groceries.

Then there was the matter of water. All our water while on the north side came from the river. We did not mind going down to get it as it gave us a chance to take a bath & wash our clothes. We never dried our-selves with a towel. Just dusted our-selves off. When our clothes dried we'd beat them against the rocks to get the dust off.

The water was hauled up in 10 Gal cans which we had about 30. As water was at a premium we only could use a limited amount for personal use. To wash teeth and in the mornings enough to wash the sleep out of our eyes.

Another thing that might be of interest to you—we brought 2 burros up by the Tower of Set. A cut Jack & a Jennie. They were brought in by way of Bright Angel Creek Kaibab Trail -- up Haunted Creek then south of Isis Temple and around the head of Trinity Creek to the Tower of Set.

Many places we had to rig up a

block & fall, put them in a sling and hoist them up over bad places. Actually they were of little use when we got them.

Of course there were a lot of funny things that happened. At that time a popular song that was sung was —"I'm forever blowing bubbles, Pretty little bubbles in the air". We would sing "I'm forever rolling boulders, Pretty little boulders down the canyon walls". That would be sung when one of the leaders, when climbing, would kick a stone loose and it would bounce down and hit or almost hit the fellow below him.

Then the time we were hoisting a burro up in a sling. We had him about 8 feet up when he kicked against the wall and jerked the rope out of our hands. Down he came on one of the fellows. There the poor fellow laid, stretched out on his stomach, spread eagle fashion, with the burro lying on him, hollering "Get that damn 500lb ass off me!"

When ever we went down to the river we would fill up a can of water and leave it in the shade, so that the next time we would go down, and of us would have a clean cool drink, as the silt would settle in the bottom. One time we noticed that the can was quite heavy with silt, so we dumped it out to clean the can. Not only did a lot of silt come out but also a decomposed pack rat. I don't know how long he was in there as the can had not been cleaned in a number of weeks. One time or another someone had forgotten to screw the cap on the can and the rat jumped in and drowned.

We would kid about the sameness of the menu -- "Now, if we had eggs we would have ham & eggs, if we had the ham".

Then we would kid a lot about Mr. DeFoe—his hat and his candy.

A word about Mr. DeFoe— Mr. DeFoe would spend most of the time at the El Tovar. Ordering supplies and doing the paper and detail work. He would come down to camp maybe once a week or every 2 weeks to check-up on things and would stay a few days.

We called him "The Old Man", (not to his face, of course). He seemed old to us as he had white hair and a pale complexion. The complexion being unusual for a man that spent most of his life out-doors in many parts of the world. China, So. America, Mexico etc. I don't think he was too old, as you know, to a young spud [not his first spelling of this word...] anyone over 35 or 40 is Old. He sure did not show his age when it came to climbing. He was as good as any of us.

Another feature about him was that he always wore a stiff straw hat. It was all the style then. They were called "Skimmers" as you could skim them through the air like a "Frizbee" (I have a picture of the hat riding up on a tram).

He always brought over cans of hard-candy. We would get some every morning before starting out. The idea was that when we got thirsty during the day we would suck on one or two, instead of pebbles, to slack our thirst. Save water. Frankly, after having a couple hard lemon balls you wanted to drink more water.

Come Thanksgiving or thereabouts (it was hard to keep track of time over there). Another fellow and I were sent down to the shelves to pick up a few items. The rest of the gang was to move camp close to Horus and Osiris Temples.

We just about arrived at the shelves when a bad snow-storm hit. It was too bad for us to climb up to camp (or maybe we didn't have enough nerve). We spent that day & night under one of the shelves. As we had intended to be gone only for 3 or 4 hours, we did not bring food with us. Nothing to eat, but did manage to keep a little fire going with dry yucca stalks and spines. We were amused by watching how the current of air below us was blowing the snow up. Snow falling up instead of down. Below us the snow turned to rain.

The next day we started back up to camp. It was very cold. When we got to the rope, where we had to swing across the crevasse, it was all iced up and our hands were plenty cold. I was scared, but did not let

on to the other fellow. (No doubt he felt the same way but would not let on to me). Eventually, we did get up enough nerve to make it.

Arriving at the top, we found that only part of the camp was there. The rest of the gang had been moving the equipment and was relaying it along the way when the storm hit. Things were scattered along the trail covered with snow. It took some time to find my bed-roll; and the transit close by. At least I got a good meal. It was then decided to stop the project. After we collected a few of our personal things we prepared to leave the next day. We left early the next day, abandoning everything else—Instruments, Tents, Food, etc. and the burros.

Luckily we did, because another snow storm hit that day altho we were down by the river and along the Tonto Trail so we did not get any [covers another word, possibly "it"] snow.

We arrived at Indian Garden long after dark. There was a tourist party stranded there, as the guide did not want to take them up as many parts of the trail was blocked with snow. We used their mules and rode up. The first after the storm. The trail was not as wide or as well kept-up as now. We arrived at the rim about midnight and was checked in at the Bright Angel Lodge. O'boy! The heat. The warm bath. The white sheets. After 3 months, DELUX!

After packing in a good solid meal, our breakfast but really a dinner as we slept so late, we went around to the El Tovar to report to Mr. DeFoe.

The desk clerk tried to stop us from going up-stairs to see him. Of course, after-wards we did not blame the clerk. We were all in rags & tags. You know what crawling & sliding over rocks will do to ones clothes and even your hide. We also had calks in our shoes and boots and what they can do to a highly polished floor & rugs is a caution. We eventually convinced him to let us go up.

We reported to Mr. DeFoe and a few days later were paid off. He then wanted 2 fellows to go back with him to take pictures. Another fellow, Jim-

mie, and I volunteered. The others went off their separate ways. I never did see any of them again, altho I was in touch with one of the surveyors, Schliemen, who sent me pictures of the out-fit some time later.

When Mr. DeFoe said he wanted to take pictures he meant he wanted to take pictures, pictures, pictures, pictures, and more pictures. He took pictures of every inch of the ground we had traveled. This is the way we operated—Mr. DeFoe would set-up his camera—I would hold a target rod off as far as he could see thru the lens—Jimmie had a small black board slate and chalk. He'd mark #1 on the slate, hold it near the camera so that the number would show up on the side of the snap-shot. The picture would be shot. Then Mr. DeFoe would set up his camera where my rod was and I'd move back and Jimmie would mark the slate #2. The picture would be taken and the same procedure would go on and on, #3-#4-#5-#6 etc. Sometimes the shots were long but there were lots of short ones due to obstacles. Many of the shots were only 10 feet, but he never missed that 10 feet. Jimmie & I would change off and on. Sometimes I would handle the slate and he the rod.

Mr. DeFoe did most of the cooking. He was a good cook. On this side of the river we did not have much but when we got near the old camp we drew from our supplies that had been left over there.

After a little over a week he was finished. We went back to the South Rim and the next day said "Good By". I threw my "bindel" on my back and was off for New Worlds to conquer.

The camp rustlers were paid \$125.00 a month which was good pay at that time, as cowboys were getting about \$50 and forest-rangers about \$75. I don't know what the surveyors were getting but they just didn't do the technical work. They supervised the whole operation. They pitched in along side of us—packed—built trams—pitched tents, etc. Just like the rest of us. And so did Mr. DeFoe. No Unions—6 hr. days—5 days a week—so many sick days and paid

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holidays—Hospitalization and other fringe benefits and of course, no Labor Relations Board. I'm afraid that if we had them years ago the West would never have been built.

I often wonder if the survey was ever continued the following year or if some-one went over and picked up the instruments. Also think of the two burro left there. How they made out? Did they pick their way down thru some hidden side canyon? We used to pick up sets of antlers from deer carcasses. Deer that had jumped down and could not get back. We had quite a few stacked up around the camp.

About 20 years later I acquired a contour map of Bright Angel Quadrangle. I marked on it, (to the best of my memory) just about where we were and how we got there. I don't think I'm too far off. I am enclosing a tracing of it. If you get a similar map hold the tracing over it and you will get a pretty good idea where we were. The details of what map it is will be written on the tracing.

Perhaps you might meet some surveyor—River-rafter or Helicopter pilot that might of saw or found some evidence that we were there. Such as a hanging rope or tram frame or other equipment. Or the bleached bones of the burros. I sure would like to know.

You could look in the 1919 registry book of the El Tovar Hotel and check up on Mr. DeFoe from San Francisco (as I said before, not too sure of the spelling). Also check up on when King Albert was there.

Also check up on the "Park Service" files. They must have some kind of record of this survey.

I have about 30 pictures of this survey and will try to get copies made of some of them to send to you if you are interested.

If you could get hold of a picture of the old cable car that crossed the river I would appreciate it if you sent me one. Kolb Bros. Studio would be the best place to look.

I don't know if this survey contributed anything to the betterment of mankind and I'm sure it will never

go down in "The Annals of the West" or "How the West was Won." But personally it was a great experience for me and left me with many fond memories.

So, if there is anything of interest to you after reading this, I will be very happy.

"Long May The Colorado Flow."

Yours
Ed. K. Thoden

Attached to this letter is a tracing of the survey route [see editor's reproduction, Figure 3] and an artistic sketch showing three views of a typical supply tram.

NOTE: Endnotes are included with the online version of this issue in the 'Ol Pioneer archives found online at GrandCanyonHistory.org.

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 Tollefsen. 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).

2. Shankland (1951).

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>).

4. Anderson (1998, pp. 152 & 154 and referenced endnotes for Chapter 4).

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

6. Shankland (1951, p. 207); Swain (1970, p. 107).

7. Shankland (1951, p. 208).

8. Swain (1970, p. 108). See <http://www.nwf.org> (National Wildlife Federation) and <http://www.ti.org> (Thoreau Institute) for more biographical information on Mather and Albright.

9. Shankland (1951, p. 208). Additional background information taken from Ryan, Spamer, and Thoden photo albums, and captions contained in Ryan's album; Thoden (1977).

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 cultural 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.

14. Ryan (1919, title page).

15. Thoden (1977).

16. Shankland (1951).

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).

18. Butchart (1973).

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).

20. Butchart (1977a); Grubbs (1977).

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).

23. Ayers (1996); Ohlman (1995).

24. Ayers (1996).

25. Ibid, p. 9.

THE PHOTOGRAPHS

26. Colter (1952).

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 (1992) and Leavengood (1999, pp. 32-45) for biographical information on Mary Jane Colter.

28. Ayers (1995, pp. 1 & 4); GRCA Photos #72-87.

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

30. Ayers (1995). A detailed, 18-page analysis of each of the 54 photos contained in the Colter album, using information derived from the Ryan album to clarify certain points.

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. PH.97.13). 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".

33. Thoden (1977). Information from the Ryan album is taken from photo captions contained therein.

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).

51. Ryan photos NAU PH97.13.87, 133, & 160 (c.f. Butchart photo #6755, 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.

57. Ayers (1995, p. 3).

58. Thoden (1977, pp. 14-15).

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!

THE THODEN LETTER

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

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

65. Manns (1977).

66. Butchart (1977b), see also Butchart (1977b, 1977c, & 1990).

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).

72. Butchart (1973).

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.

74. Butchart (1977a).

75. Ohlman (1978b).

76. Ohlman (1994a). Photos are in the personal collection of Daniel Hartley, Tucson, Arizona.

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.

80. Ohlman (1995).

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).

83. Ryan photos NAU PH97.13.126-128.

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.

88. Ayers (1996, p. 5); Ryan photos NAU PH97.13.65, 136 & 146.

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.

90. Butchart (1977a).

91. Ayers (1996, pp. 6-7).

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.

93. Ibid, p. 7; Ohlman (1995).

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

95. Ayers (1996, p. 8).

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

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