THE CROSS CANYON CORRIDOR HISTORIC DISTRICT IN GRAND CANYON NATIONAL PARK: A MODEL FOR HISTORIC PRESERVATION

by

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ABSTRACT

THE CROSS CANYON CORRIDOR HISTORIC DISTRICT
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A MODEL FOR HISTORIC PRESERVATION

Teri Ann Cleeland

This thesis is a comprehensive historic preservation study of the proposed Cross Canyon Corridor Historic District in Grand Canyon National Park. It provides data which are essential for nomination to the National Register of Historic Places, such as a history of the trail corridor and associated development areas, a discussion of how the resources relate to identified National Register criteria and themes, and a delineation of district boundaries based on these and other considerations.

National Register nomination is, however, only the first step toward preservation of historic resources. Their integrity must remain intact as well. Physical integrity can be protected by initiating a cyclic maintenance program. Maintenance problems in significant historic structures are identified, and suggestions are made on how to carry out the maintenance program. Architectural integrity can be protected by ensuring that modifications and new construction in the district are compatible with the historic setting. The architectural features which define the overall character of the

district are analyzed, and suggestions for new construction are forwarded based on the analysis.

Furthermore, this study explores the relatively new problem of how to delineate boundaries in a rural historic district. The thesis should have practical application for managers of other National Parks who must contend with increasing numbers of historic resources within their jurisdiction, since each year more and more structures attain the 50-year age requirement for inclusion on the National Register.

Some final suggestions are made on how to carry out the recommendations contained in the thesis. With recent federal budget austerity, we can no longer expect the government to bear the full burden of historic preservation. Involvement by state and local governments, corporations, and the public will become increasingly important to the success of federal preservation projects.

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My husband, Larry Lesko, brought me to Phantom Ranch for the first time, and without him, this thesis would never have been written. This one's for you, Lorenzo.

TABLE OF CONTENTS

Page

List of Figures ix

List of Tables xii

Chapter

1. Introduction 1

The Cross Canyon Corridor Historic District Study 1
Background Information 3
Management Concerns 4
Summary 6
Research Methods 7
Supporting Legislation 8
Compliance 10
Recommendations 11

2. The Bright Angel Trail Corridor: Developmental History 12

Location 12
History of the Bright Angel Trail 14
Indian Gardens 27
Phantom Ranch 39
Early History 39
Fred Harvey/Santa Fe Railroad Concession Buildings 42
United States Government Buildings . . . 51

3. District Architectural Evolution 62

Introduction 62
Rustic Architecture 62
The Architecture of Phantom Ranch . . . 65

4. Design Analysis and Considerations for New Construction 74

Introduction 74
Architectural Features 76
Recommendations 82
Interiors 90
Guidelines 91

Summary 92
Available Resources 92
Design Compatibility 93
Restoration Hardware:
Commercial Sources 93
General Interest/Bibliography 94

5. Cyclic Maintenance for Historic Structures . 95

Introduction 95
Inspection Technique 96
A Summary of Findings 96
Recommendations 101
General Guidelines for Maintenance . . . 102
References for Historic Structure
Maintenance 103

6. National Register Evaluation of the Proposed
Cross Canyon Corridor Historic District . . 105

National Register Criteria 105
Historic Districts 106
Context and Themes 107
Historical Context and Periods of
Significance 108
Tourism: Period of Significance 110
Architecture: Period of Significance . . 113
Transportation: Period of Significance . 114
Politics/Government: Period of
Significance 115
Integrity 117
Summary 119

7. Boundary Delineation

Introduction 120
Contributing Elements 120
Defining the District Boundary:
Some Considerations 121
The Historic Scene 123
Boundary Width 125
Trails 127
Trailside Attractions 128
Contributing Features 128
Trailside Shelters 129
Contributing Structures 129
Development Areas 129
Sub-Districts 130
Indian Gardens 130
Phantom Ranch 131
Noncontributing Structures 133
Summary 133

8. Recommendations and Concluding Remarks . . . 136

Recommendations 136
Concluding Remarks 142

List of References 146

LIST OF FIGURES

Figure		Page
1.	Overview of the Proposed Cross Canyon Corridor Historic District	in back pocket
2.	Map of the Bright Angel Trail	in back pocket
3.	The Bright Angel Trailhead After Reconstruction, 1932	21
4.	Bright Angel Trail Oiling, September, 1932 . .	23
5.	Bright Angel Trail Oiling, September, 1932 . .	23
6.	Three-Mile House Trailside Shelter, 1936 . . .	25
7.	Mile-and-a-Half Trailside Shelter, 1936 . . .	26
8.	River House Trailside Shelter, 1936	26
9.	Indian Gardens in 1908, Facing South	29
10.	Map of Indian Gardens in 1916. Note Locations of Tents, Stone House, and Trail Maintainer's Tent	30
11.	Mary E. J. Colter Drawing for the Proposed Indian Gardens Dining Hall, 1916 . .	32
12.	Mary E. J. Colter Drawing for a Proposed Indian Gardens Guest Cottage, 1916	33
13.	Indian Gardens Today, With NPS Building Numbers and Dates of Construction	35
14.	Indian Gardens Trailside Shelter, 1937	36
15.	Indian Gardens Mule Barn, 1937	37
16.	Physical Changes at Indian Gardens for Selected Years. New Buildings are Shown in Black	38
17.	Rust Cable Car at the Colorado River, ca. 1907	40
18.	Rust Camp, ca. 1907	41
19.	First Colorado River Suspension Bridge, ca. 1922	41

Figures (continued)

20. Phantom Ranch Today, With NPS Building Numbers and Dates of Construction 44

21. Phantom Ranch Dining Hall Addition in Foreground, 1928 Guest Cabin in Far Rear. Facing North, Photo ca. 1961 46

22. West Side of the Dining Hall, Phantom Ranch. Facing South, ca. 1923 46

23. Excavating the Swimming Pool, 1934. Facing South, Note the Recreation Hall (#878) in Rear 48

24. Finished Swimming Pool, 1936, Facing North . . 48

25. The Phantom Ranch Pool, ca. 1961. Note Cabins in Rear: 1928 Cabins Left, 1922 Cabin (#891) Right 49

26. Phantom Ranch Hiker Dorms, Facing North, 1985 51

27. Packing in Supplies on the South Kaibab Trail, ca. 1922 52

28. The USGS Hydrographer's Cabin, ca. 1922 54

29. The Rock House, 1936. The CCC Crew is Surveying the Location for the Rock House Bridge 55

30. The Phantom Ranch Mule Barn Today. Note the Rock Pier for the Sewer Line, Right Foreground 58

31. Physical Changes at Phantom Ranch for Selected Years 61

32. This 1922 Photograph of the Phantom Ranch Manager's Cabin Illustrates a Typical Colter Building 66

33. Indian Gardens Trailside Shelter Plan, 1935 Note the Surrounding Boulders 69

34. Indian Gardens Ranger Station, Facing South, 1985. The Recent Addition is to the Right 71

35. The Adirondack Shelter, Phantom Ranch, 1985 . . 72

Figures (continued)

36. This 1932 Plan for the Indian Gardens Ranger Station (#93) Illustrates Features Typical of NPS Rustic Style Structures 83

37. This 1930 Drawing of the West Elevation of the Trailcrew Bunkhouse (#875) at Phantom Ranch Illustrates the Following Design Elements 84

38. This 1929 Drawing of the Phantom Ranch Showerhouse Shows More Typical Architectural Features in the District . . 85

39. This Recent Photograph of Guest Cabin # 9 Shows the Original Handcrafted Dutch Door, Decoratively Carved Rafter Ends, and Double Purlins 86

40. Wooden "Baseball Mitt" in the Wall of the Dining Hall 88

41. Plan View of Phantom Ranch Guest Cabin #10. Reference Numbers are Used in Tables 2 and 3 97

LIST OF TABLES

Table		Page
1.	Design Features Used in the Analysis	74
2.	Maintenance Inspection Form for Cabin 10. The Reference Numbers are Keyed to Figure 41	98
3.	Maintenance Inspection Form for Cabin 10, Keyed to Building Features	99
4.	Phantom Ranch Contributing Structures	132
5.	Cross Canyon Corridor Historic District Noncontributing Structures	133

Chapter 1

INTRODUCTION

The United States has experienced a growing interest in historic preservation during the 20 years since passage of the National Historic Preservation Act (PL 89-665). The National Register of Historic Places, essentially created by the Act, has been the primary tool for effecting preservation. Since 1966, about 38,000 properties have been entered on the National Register, including some 4,000 historic districts representing over a quarter million individual properties (Walter 1985: 9). National Register listing has often been viewed as the end of the preservation process, but it is really only the beginning. Defined in its broadest sense, historic preservation is the planned protection, maintenance, and use of architecturally and historically significant properties. Long-term planning for the care and use of National Register properties is an essential part of historic preservation.

The Cross Canyon Corridor Historic District Study

In this thesis, I present a comprehensive historic preservation management study of a major portion of the proposed Cross Canyon Corridor Historic District in Grand Canyon National Park, Arizona. Many aspects of historic

district management will be discussed. In addition to presenting documentation which will be useful in a National Register District nomination, I propose the establishment of a cyclic maintenance program for historic structures, and also identify architectural features which merit incorporation into designs for new construction.

In reviewing the literature, I found a surprising paucity of preservation management plans for historic resources on government lands. Since my methodology could be adapted to anyplace, this study will be of vital interest to preservationists who manage rural historic districts, particularly within the National Park Service and other governmental agencies. It can also serve as a model for management studies of historic districts in general.

As applied anthropology, this thesis draws from several disciplines to arrive at a broader view of the historic district. I utilized techniques from the fields of history and architecture throughout the research phase of the project, but anthropology provided the central focus which linked mute structures to the human experience. Anthropology is the study of human behavior throughout all time. Architects study the built environment and historians study human history: anthropologists combine the two fields. In historic preservation, we are fortunate to have written records which confirm observations made in the field and allow for precise dating of observed physical changes. Anthropologists have a unique contribution to make to historic preservation because

they provide a broad and deep perspective on human history and the built environment.

Background Information

The proposed Cross Canyon Corridor Historic District includes the main inner canyon trail system, consisting of the Bright Angel Trail, North and South Kaibab Trails, and the River Trail; along with the development areas of Indian Gardens, Phantom Ranch, Cottonwood Campground, and Roaring Springs (Figure 1). At the request of the National Park Service, the Museum of Northern Arizona conducted an archaeological survey along these trails in 1974. They found 34 sites in a 300-foot-wide trail corridor and in development areas. Most of the sites are prehistoric, but four are limited activity historic sites (Brook 1974). None of the four sites are located within the proposed historic district boundary. In 1980, efforts to gain historic recognition of the area began with staff members of the Denver Service Center, National Park Service, who prepared a district nomination to the National Register of Historic Places.

The nomination never progressed beyond the draft stage. However, the work provided the initial point of departure for this study. It was inadequate from a management perspective for several reasons. First, it failed to identify and fully describe all of the properties located within the vaguely drawn district boundaries. Dates of construction and modification of many district structures are often either lacking or incorrect. Furthermore, it did not provide sufficient

contextual information on which to assess the significance of individual properties or their overall contribution to the district. Finally (although this step is not required for a National Register nomination), it gave little attention to future management of the district as a whole, or to individual structures within it. The authors were allowed little time for either research or fieldwork, which is undoubtedly why the nomination remained in draft form.

In this study I attempt to correct the inadequacies of the initial draft nomination by presenting a more thorough investigation of a major portion of the proposed district: The Bright Angel and River Trails, and development areas at Indian Gardens and Phantom Ranch. Other places worthy of future study include: the North and South Kaibab Trails, Cottonwood Campground, and Roaring Springs.

Management Concerns

Even though the Cross Canyon Corridor Historic District is not listed on the National Register of Historic Places, the law provides the same protection to historic structures which are considered eligible for inclusion as it does to those which are listed. Grand Canyon National Park is therefore obligated to provide for the proper management of significant structures within the proposed historic district. To fulfill that objective, park managers must have information on existing properties, including an inventory, documentation, and assessment of significance and physical condition. A major section of this thesis outlines the

history of physical development within the study area. This provides an overall historical context, and accounts for the evolution of individual structures to their present appearance.

It is important to remember that the district is more than just a collection of historic buildings. The trails, bridges, mining adits (tunnels), pictograph sites, reservoirs, pumphouses, and other structures are also enormously important. Taken together, this ensemble is essential to understanding the overall history and significance of the district. Of the nearly 70 structures identified in the district, 48 are considered to contribute to its architectural and/or historical significance within defined themes.

Even with inventory, evaluation, and nomination, the Park is required by law to protect the integrity of significant structures. Structural integrity can be maintained in most cases by initiating a cyclic maintenance program. Architectural integrity can be maintained by ensuring that future construction projects respect the established architectural character of the district.

To assess present structural conditions, I examined selected historic buildings using a standard maintenance inspection format, and forwarded suggestions for initiating a cyclic maintenance program. If relatively minor maintenance problems are identified and corrected before they become serious, then preservation of significant historic buildings and structures can be efficiently and effectively managed.

To ensure that the overall architectural character of the district is maintained despite inevitable new construction, I conducted an architectural analysis, which identified distinguishing architectural features in the district. The features examined include: building height, building size, proportions, massing, orientation and site utilization, directional expression, facade rhythm, door type, window type, roof form, building materials, color, texture, detailing, and landscaping. Such analysis should be undertaken when considering new construction, so that new designs are compatible with the old.

Summary

In this thesis, I present an overall management document for historic resources within a major portion of the proposed Cross Canyon Corridor Historic District. The following elements are components of the study:

National Register Documentation: Description and Analysis

1). A narrative history of the general development of the district, and of each individual structure, is presented. An outline of how historic structures evolved to their present appearance is also provided.

2). Relevant historical themes are discussed and the significance and integrity of individual structures is assessed within the context of these themes.

3). Based on significance and integrity, individual structures are determined to be either contributing or non-contributing elements in the district.

4). District boundaries are then delineated based upon the above considerations.

Architectural Analysis

1). An architectural analysis of structures identifies those features which define the character of the built environment in the inner canyon, and suggests ways that the analysis can be used to make future construction and modifications compatible with the old.

Basic Documentation

1). I completed a photographic documentation of all structures located in the district. Prints and negatives are curated at the Study Collection, Grand Canyon.

2). The Grand Canyon historical architect and I conducted a maintenance inspection of selected contributing buildings, and forwarded suggestions for initiating a cyclic maintenance program. Cyclic maintenance will help preserve the structural integrity of historic properties.

Research Methods

As with most such projects, this one required extensive and intensive fieldwork and research. I first conducted a cursory tour of the district to familiarize myself with the structures. Then I combed the archives at the Grand Canyon Study Collection. They have an excellent collection of old

maps, building plans, photographs, letters, reports, invoices, and other documentation relating to the district. The Special Collection Libraries at Northern Arizona University and the University of Arizona provided further assistance. I spoke to old-timers and asked them questions about what the district was like when they knew it. Microfilmed architectural plans for buildings in the district stored at the Park Service Western Regional Office in San Francisco were also extremely helpful.

I brought copies of old maps, photographs, and architectural plans into the field with me for comparison with the present appearance of features. If I saw a discrepancy between the old and the new, I knew which questions to ask when reviewing the archives. I became well-acquainted with each structure, especially since part of my fieldwork involved inspecting some of them and photographing four views of each one.

Supporting Legislation

The United States has a long history of stewardship over cultural resources. Various laws and accompanying regulations designed to protect and manage our nation's cultural resources have been enacted by Congress in the past 80 years. Under federal legislation, the National Park Service has assumed a leadership role in historic preservation. Cultural resource management programs and policies developed in response to specific legislation. Those most applicable to historic resources are briefly discussed below.

The Historic Sites Act of 1935 (PL 74-292) authorized two programs to document significant American buildings and structures: the Historic American Buildings Survey (HABS) and the Historic American Engineering Record (HAER). It also established national historic sites and landmarks (administered through the Park Service) and encouraged cooperation among agencies, governments, and academic disciplines in preservation efforts.

The National Historic Preservation Act (NHPA) of 1966 (PL 89-665) expanded on the 1935 act and established a national policy of historic preservation. The NHPA essentially created the National Register of Historic Places (also administered by the Park Service) to include properties of national, state, and local significance, established the Advisory Council on Historic Preservation, and provided procedures for federal agencies to follow if a proposed project might have an effect on a property listed on the National Register. In 1976, the law was amended to afford protection to properties considered eligible, as well as those actually listed.

Executive Order 11593 (36 FR 8921) of 1971 amplified the NHPA and instructed all federal agencies to provide national leadership in historic preservation. Specifically, it directed agencies to "locate, inventory, and nominate to the Secretary of the Interior all sites, buildings, districts, and objects under their jurisdiction or control that appear to qualify for listing on the National Register of Historic Places."

A 1980 amendment to the NHPA (PL 96-515) subsumed many of the EO 11593 requirements and is the principal authority for this study. The amendment required each agency to establish a program to locate and inventory all properties under their control and to nominate potentially eligible ones to the National Register. Agencies were further directed to act with caution when considering demolition, transfer, substantial alteration, or actions which may cause deterioration of eligible properties.

Compliance

To comply with this legislation, the National Park Service developed specific policies that guide individual parks in their management programs. These policies are outlined in a Park Service document called "Cultural Resources Management Guidelines (NPS-28)" (Dec. 1981). Park managers are directed to "locate, identify, evaluate, preserve, manage, and interpret qualified cultural resources in every park. . . ."
The following steps are outlined to achieve these goals:

1). Complete a basic inventory of cultural resources on park lands.

2). Determine which resources are significant enough to qualify for preservation.

3). If possible, preserve extant cultural resources which qualify for preservation.

4). Interpret the significance of these resources to the public (NPS 28 1981: 1).

Recommendations

These are the laws and accompanying regulations which authorize and obligate the Grand Canyon National Park to identify, document, manage, and protect its significant historical resources. This study provides management data on the historic structures in only a small portion of the Grand Canyon; it is recommended that similar studies be conducted in additional areas. In the inner canyon, development areas at Hermit Basin or Horseshoe Mesa warrant study, as do the many historic trails. Management data on the many isolated inner canyon historic resources might be integrated into National Register thematic nominations highlighting themes like mineral exploration or tourism, or as components of a Multiple Resource Area nomination. Specific recommendations for the proposed Cross Canyon Corridor Historic District will be more clear once the history of physical development in the corridor is understood. The following chapter provides this background.

Chapter 2

THE BRIGHT ANGEL TRAIL CORRIDOR: DEVELOPMENTAL HISTORY

The Bright Angel Trail in Grand Canyon National Park is one of the most famous footpaths in the world, enjoyed by over 150,000 hikers and mule riders each year. The trail corridor has seen use for hundreds of years, providing entry into the canyon for seekers of various goals.

This chapter focuses on the physical history of the trail and structures associated with it, and is thus concerned only with events surrounding development in the past century.

Location

Sheer cliffs pose formidable barriers to travel within Grand Canyon. In a few places, geological faults have opened up natural passageways for man and animals. The Bright Angel Fault is one such feature. Animals undoubtedly first beat a path along the fault line, followed by groups of prehistoric Cohonina and Anasazi Indians. The spring waters at Indian Gardens, midway to the Colorado River, nourished crops and enabled prehistoric groups to thrive in a hostile desert environment. The Havasupai lived at the springs intermittently into the early part of this century.

Figure 2, located in the back pocket, illustrates the course of the Bright Angel Trail. It is not known exactly where the aboriginal route was located, but today the trail leaves the South Rim near Kolb Studio, dropping down through the Kaibab Limestone. Just past the first tunnel, to the left of the trail, Havasupai pictographs can be seen in a ledge known as "Mallory's Grotto". The trail then descends in a series of switchbacks and through a second tunnel in the Coconino Sandstone cliffs to the sloping Hermit Shale, where Mile-and-a-Half Resthouse is located. Just past the resthouse, in the Supai Formation, more Havasupai pictographs can be seen. Three-Mile Resthouse is perched at the top of the sheer and thick Redwall Limestone cliffs, one of the most prominent natural features of the canyon.

The switchbacks in the Redwall, known as Jacob's Ladder, is one of the steepest sections of the trail. Below the Redwall, the trail gently descends through the Tonto Group to Indian Gardens on the Tonto Plateau. The plateau is a layer of impervious Bright Angel Shale, which stops water percolating through the layers above and forms the springs of Garden Creek. The Tonto Trail, which intersects the Bright Angel at this point, traverses the nearly level plateau above and parallel to the Colorado River.

The Bright Angel Trail follows along Garden Creek below Indian Gardens through the narrows of Tapeats Sandstone, whose walls hold remains of prehistoric dwellings and storage granaries. Soon the trail heads east toward Pipe Creek, reached by descending precipitously through Vishnu Schist in

a series of switchbacks known as the Devil's Corkscrew. The trail then follows Pipe Creek to the Colorado River. To reach Phantom Ranch, two miles east, hikers travel along the River Trail, dynamited out of the sheer inner gorge walls of schist. Hikers and mule riders descend some 4,500 feet on the 7.8 mile long trail from rim to river, and pass through several life zones, from pine forest to desert.

History of the Bright Angel Trail

Euro-Americans were late arrivals to the Grand Canyon region. Sixteenth-century Spanish explorers found little potential in the Colorado River, lying an impassable distance from the rim. Three hundred years later American explorer Joseph Christmas Ives declared the area "a profitless locality." (Ives 1861: 110). John Wesley Powell, a more visionary man, saw the canyon as a place of beauty and grandeur. It was also his laboratory, for in 1869 he led the first scientific expedition through the canyon, investigating the natural and cultural history of the area. His observations were important to the fledgling science of geochronology, since Grand Canyon revealed more of the earth's history in its exposed rock layers than any other place yet explored.

On August 15, 1869 Powell and his exploration party camped at and named Bright Angel Creek, "a clear, beautiful creek, coming down through a gorgeous red canyon" (Powell 1961: 256). Powell also discovered "the ruins of two or three old houses, which were originally of stone laid in mortar." (Powell 1875: 87). He described the prehistoric

Bright Angel Site, a small pueblo occupied by Anasazi Indians between AD 1060 and 1150. The School of American Research excavated and stabilized the site in 1969. Today it is the only interpretive archaeological site located within the inner canyon.

The canyon harbored only Native Americans until the railroad arrived in 1882. Passing as close as 60 miles south of the canyon, it provided a link with the eastern United States, resulting in rapid growth and change in northern Arizona. In 1883 it brought to Flagstaff a man who would figure prominently in the Bright Angel Trail story--Ralph Henry Cameron.

Cameron was one of many prospectors who explored the canyon for mineral resources during the 1890s. Working in partnership with others, Cameron filed several mineral claims in the canyon, including the successful Last Chance copper mine located at Grandview, some sixteen miles east of the present Grand Canyon Village and 2,500 feet below the South Rim on the Tonto Platform (Strong 1978a: 43). In order to reach such claims, prospectors had to construct suitable trails for bringing pack animals down to inner canyon claims; the trails remain today as their legacy.

In December of 1890, several men including Peter Berry, Ralph's brother Niles Cameron, Robert Ferguson, C.H. McClure, and M.G Love began improving the old path to Indian Gardens. After expending some two months and about $500, they made the trail suitable for passage of cattle and horses (Cameron

Papers, Box 5). The following February, Berry traveled to the Yavapai County courthouse and recorded the "Bright Angel Toll Road" as follows:

> I, Peter D. Berry, of the town of Flagstaff, County of Yavapai, Territory of Arizona, do hereby certify that I have commenced the construction of and intend to complete a toll road commencing at low water mark on the Colorado River and a point twenty-six hundred feet west of the mouth of Bright Angel Creek, running thence through the Indian Gardens in the Grand Canyon. . . . Said toll road shall be known as the Bright Angel Toll road, a plat of which said toll road is hereto annexed.
>
> Signed:
> Peter D. Berry
> (Yavapai County 1891: 40-42)

Although a rudimentary route from Indian Gardens to the Colorado River probably existed in 1891, the trail was not extended to it until early 1899. Niles Cameron, C.H. McClure, John Holford, and D.W. Barter spent several months that winter completing the Bright Angel Trail.

Berry and his partners focused their energy on their successful Last Chance mine at Grandview and by 1897 the little-used Bright Angel Trail had fallen into disrepair (Strong 1978a: 46). Lombard, Goode, and Company, who also held canyon mining claims, spent about $200 in 1897 or 1898 to repair and realign about one-third of the trail between the Rim and Indian Gardens (Carrel 1932: 1, Cameron Papers, Box 5). On November 10, 1897, the company's agent, William O. (Buckey) O'Neill, filed a notice in the Coconino County Courthouse in Flagstaff for the "Indian Gardens Toll Road" which ran from O'Neill Camp (at the present Bright Angel

Lodge) to the Colorado River by way of Indian Gardens (Coconino County 1897: 114). (Coconino County was created from parts of Yavapai County in late 1891.) Since Berry still held legal rights to the Bright Angel Toll Road, O'Neill's intentions are unclear. He may have considered the original deed invalid because the owners had abandoned the trail, but the answer will never be known. O'Neill, one of Theodore Roosevelt's Rough Riders, was killed in the famous charge up San Juan Hill, Cuba, the following July. Lombard, Goode, and Company never pursued inner canyon claims, but they did build a railroad most of the way to the canyon.

When the Grand Canyon Railway arrived at the South Rim in 1901, the Bright Angel Trail became a gold mine of tourists' dollars, and the center of a long-standing fight over ownership. Under existing legislation, individuals were permitted to build a road or trail on public domain and, once registered, charge a toll on it for ten years. If the builder had not recaptured his original investment after ten years, the county could extend the franchise for an additional five years (Strong 1978a: 47). In 1901, Coconino County granted Pete Berry a five year extension of the original franchise and Ralph Cameron promptly bought out Berry's interest in the trail. He began charging travelers a $1.00 toll, justified by what he later asserted were $18,000 in expenditures on trail construction and maintenance between 1890 and 1903 (Strong 1978a: 47). To his credit, Cameron probably did spend considerable funds to upgrade what must have been a crude trail, but he also made a tidy profit. A

record of tolls collected and expenditures for the quarter ending July, 1907 shows that Cameron collected $1542. He paid $185 to the county and territory, spent $99.75 on trail repair, and kept $1257 as profit (Cameron Papers, Box 5).

To strengthen his hold in the canyon, Cameron filed mining claims at strategic points along the trail: on the South Rim trailhead, at Indian Gardens (the only water available to the Colorado River), at the Devil's Corkscrew, and at Pipe Creek, the trail's end. Under current mining laws, Cameron had only to either work on developing the claims or pay a $100 fee annually to retain the land as if leased from the government (Strong 1978a: 48, 51).

When Berry first filed the Toll Road notice in 1891, the land was part of the public domain. The area became a Forest Reserve in 1893, and the General Land Office in the Department of Interior assumed nominal authority in 1897. Active administration of the land did not begin, however, until 1908, when it became a National Monument. The Forest Service stationed rangers in the Monument and began to regulate land-use activities at that time. Grand Canyon National Park was established in 1919, and jurisdiction returned to the the Department of Interior, under the newly-created National Park Service. These governmental agencies and a private developer, the Santa Fe Railroad, disliked Cameron's exploitation of the canyon and for years challenged him unsuccessfully in court over his right to control the trail. Local people were sympathetic to Cameron, resenting government and corporate

intrusion on private enterprise. Many of them, like Cameron, had lived in the area long before these "usurpers".

Voters elected Cameron to the U.S. Senate in 1920, where he used his influence ruthlessly to retain and exploit the trail corridor. In 1922, Senator Cameron managed to have the yearly operating funds for Grand Canyon National Park eliminated from the Department of Interior appropriations bill. Protest from other congressmen restored part of the funds, but Cameron had raised a congressional furor over the issue which did not ease for the four remaining years he was in Washington. In 1924, the U.S. Government offered Coconino County $100,000 to improve the old South Rim approach road from the town of Maine (midway between Flagstaff and Williams) in exchange for the Bright Angel Trail. The controversial offer was put on the 1924 general election ballot, but voters rejected the bid, believing that the government would improve the road anyway (Verkamp 1940: 58-9).

The National Park Service (NPS) then decided to bypass the problem by building a totally new trail to the Colorado River from Yaki Point, three miles east. The new South Kaibab Trail, begun in 1922 and completed in 1925, had advantages in addition to relieving the Park Service of the Cameron problem. At 7.5 miles, it was far shorter to the suspension bridge spanning the Colorado River than the old route--which left Indian Gardens, traversed the Tonto Platform, and then descended along the Cable Trail at the Tipoff to the bridge, about 11 miles. Engineered with gentler grades than the Bright Angel then had, the Kaibab Trail was

also designed as an all-weather route, receiving maximum sunlight to provide ice-free winter travel (Coconino Sun Nov. 6, 1924). Travelers crossed the Colorado River on a swinging suspension bridge, so precarious that only one mule could pass at a time. In 1928, a new rigid suspension bridge replaced the old one, allowing easier passage.

Cameron's political influence and hold on the trail soon began to wane. He lost his 1926 Senate reelection bid and, undoubtedly tired of litigation over the trail, moved to the eastern United States. When the government again offered to exchange the Bright Angel Trail for a new approach road, the county accepted. On May 22, 1928, the trail was finally deeded to the National Park Service (Strong 1978b: 170). An era of private enterprise was over and one of public stewardship began.

The NPS immediately lifted the $1.00 toll and initiated reconstruction of the entire trail. The original trail had very steep gradients (up to 40 percent), numerous switchbacks, and in places was subject to washouts. The Park expended $50,000 on the trail between 1929 and 1931, widening it to four feet and lessening grades (Carrel 1932: 2). Although the trail was totally relocated, in most places it simply paralleled the existing trail. Figure 2 illustrates known sections of the old trail which diverge from today's.

Between November 1929 and July 1930, crews reconstructed the trail from Indian Gardens to Pipe Creek, moving it from Salt Creek west to Garden Creek and bypassing the famous old

Devil's Corkscrew with a series of long switchbacks (Carrel 1932: 2). The Cameron trail along this section is still clearly visible; original rock retaining walls, embankments, and wooden treads remain on the Salt Creek stretch.

The following October, work began on the trail above Indian Gardens. The difficult Jacobs Ladder section through the Redwall Limestone had to be blasted through solid rock walls to ease grades. The first tunnel near the trailhead had to be widened so that the trail could be routed through it on longer and gentler switchbacks. The original trail did not go through the tunnel, but descended in steep switchbacks east of it. (Figure 3 shows the old and new trail sections at the trailhead.) The tunnel, located in

Figure 3

The Bright Angel Trailhead After Reconstruction, 1932

Cameron's Cape Horn claim and excavated by him, originally provided access to "Mallory's Grotto", a collection of pictographs found in a ledge just beyond it. The second Cameron tunnel one mile below in the Coconino Sandstone was similarly widened. The upper trail reconstruction, halted in May of 1931 due to lack of funds, was completed by a crew "of four or five special white laborers and fifteen to twenty Supai Indians" (Carrel 1932: 4).

In the fall of 1932, the Park initiated a program of trail oiling in an effort to keep down the ubiquitous red dust (Underhill 1932: 2). The process was laborious. Crews struggled with an unwieldy "Cetrac trail oiler" down nearly two miles of trail (Figures 4 and 5). The machine could not be transported past that point, so workers had to apply the oil by hand with a spray nozzle from there to Pipe Creek, and mules packed in the oil (Carrel 1933: 1).

The following year, 1933, saw the arrival of the Civilian Conservation Corps (CCC) at Grand Canyon, initiating a flurry of activity within the Park. Money and manpower from this Depression era job relief program became available for a variety of construction projects in the study area. Crews again oiled the Bright Angel Trail and the CCC began obliterating the original Bright Angel Trail to a point about one-and-a-half miles below the rim (Langley 1933b: 3). This section is still faintly visible from the Trail Overlook on the West Rim Drive. The CCC obliterated other trail sections, such as the Cable Trail, but probably never reached

Figure 4

Bright Angel Trail Oiling, September, 1932

Figure 5

Bright Angel Trail Oiling, September, 1932

the Salt Creek section of the old trail below Indian Gardens, which still remains intact.

Funds became available to reconstruct 1,700 feet of trail as it ran through the Supai Group, the only remaining part of the upper trail needing work (Tillotson 1933: 24). The final one-and-a-quarter miles of trail reconstruction along Pipe Creek to the Colorado did not begin until 1938. Most of the trail was blasted through solid rock and took over a year to complete. At the end of the trail, where the River Rest House stood, the NPS added a comfort station and corral, as well as some 2,500 feet of waterline and two drinking fountains. Today only the River Rest House and stone piers for the waterline remain. This section cost about $20,000 to build (GCNP 1940: 1, 2).

In 1937, a crew of Havasupai workers again coated the Bright Angel Trail with three inches of oil (Tillotson 1937). Since no further references are made to trail oiling in the Superintendents reports, this may have been the final treatment. Park officials might have decided that the laborious process outweighed the benefits of dust control, or they simply wanted to return the trail to as natural a setting as possible. Since 1939, the Bright Angel Trail has received only routine maintenance. Maintenance primarily involves filling in deep troughs made by mule hooves with fill from borrow pits. Repair to retaining walls is also occasionally carried out as needed.

CCC crews constructed four hiker's shelters along the Bright Angel Trail between 1935 and 1937, in the following order: Three-Mile House (Figure 6) (1935), Mile-and-a-Half-House (Figure 7) (1936), River Rest House (Figure 8) (1936), and Indian Gardens Rest House (1937) (Kuehl 1935a, 1935b, Tillotson 1936). The River Rest House, which contained naturalist and geological exhibits and a telephone, burned in 1956. The rock walls remained intact and the NPS soon replaced the wooden superstructure exactly as the original (1949 building inspection form).

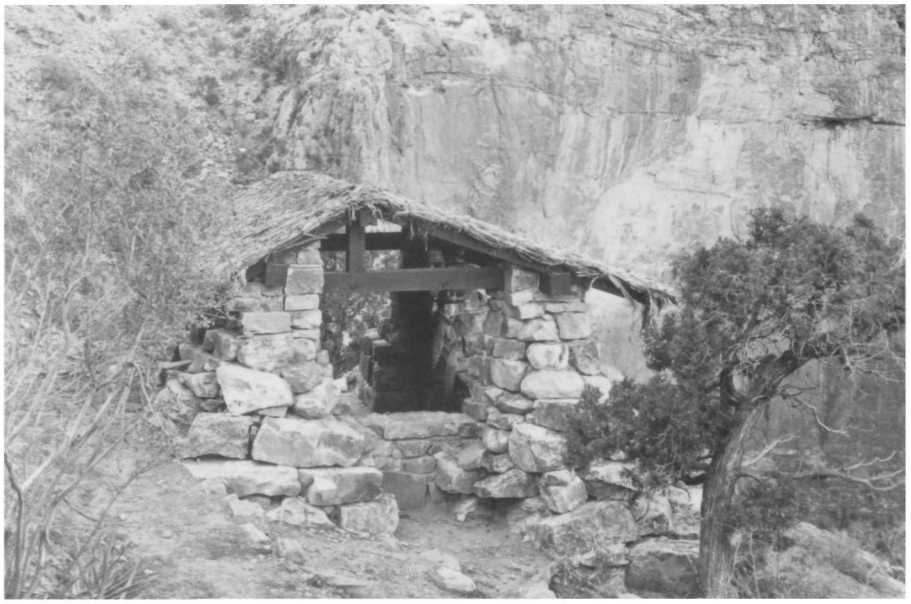


Figure 6

Three-Mile House Trailside Shelter, 1936

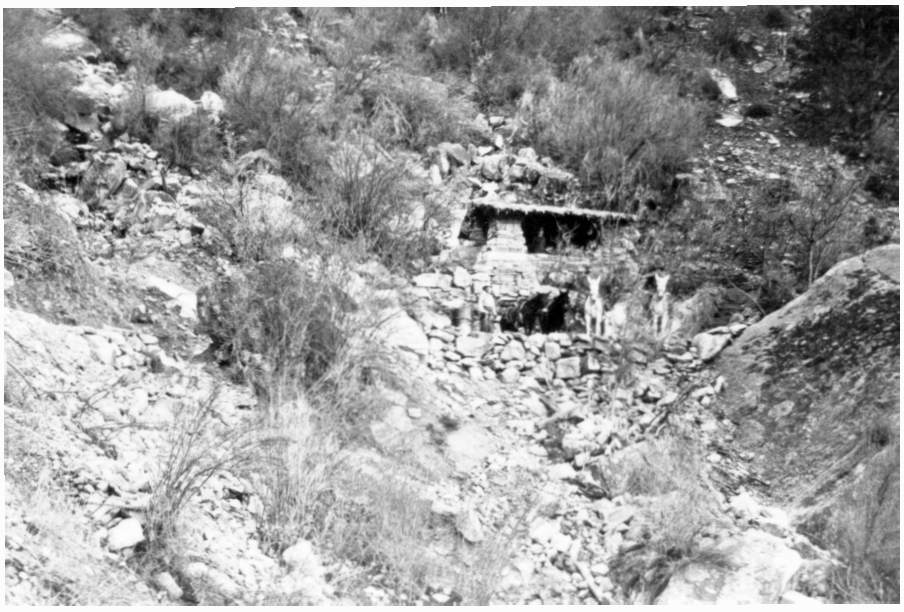


Figure 7

Mile-and-a-Half Trailside Shelter, 1936

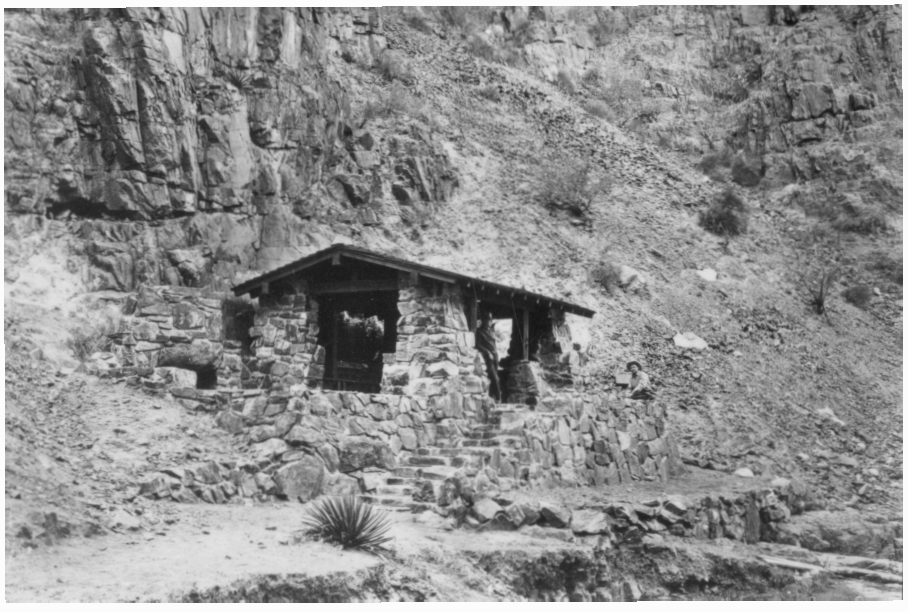


Figure 8

River House Trailside Shelter, 1936

On March 20, 1981, the U.S. Department of Interior and the Heritage Conservation Service designated all the main corridor trails (the Bright Angel, River, and South and North Kaibab Trails) components of the National Trails System.

Hikers who rest in the peaceful shade of the Cottonwood trees at Indian Gardens are likely unaware of its sometimes turbulent history. Today the place bears little resemblance to its former appearance.

Indian Gardens

As an oasis in a waterless land, Indian Gardens has long been an inviting destination for humans. Archaeological sites indicate the presence of the prehistoric Anasazi and Cohonina cultures dating from A.D. 900 as well as the historic Havasupai. Some Havasupai continued to live intermittently at Indian Gardens long after Ralph Cameron took possession in about 1901, according to the 1916 Forest Service Working Plan: "The cliffs nearby have cave houses and dugouts as living quarters for the Supai Indians. . . . " (Johnston and Leopold 1916: 9).

In the first years of this century, Cameron transformed the treeless desert into a lush stopover for tourists. He planted cottonwood trees in 1903 and dammed up the creek to irrigate a garden containing strawberries and vegetables. He later planted peach and apple trees (Metzger 1978: 29). Indian Gardens even had telephone service to the South Rim as early as 1903. A traveler in 1909 described the place as "a beautiful broad plateau on which is situated Indian Gardens.

A good spring, a little patch of cultivated garden land, and a sort of halfway house where cool drinks may be purchased, constitute the settlement. Many people come down to spend the night in the tents. . . . (McCutcheon 1909: 118). Figure 9 pictures Indian Gardens as it then looked.

The Working Plan map, surveyed in 1917, (Figure 10) shows a much larger settlement at Indian Gardens, including a kitchen, root cellar, rain gauge, incinerator, tool shed, alfalfa field, garden, and stone "halfway house" (with no roof). This structure had been standing since at least 1906, yet it was never finished. Farther north, at the junction of today's Bright Angel and Tonto Trails, sat the trail maintainer's tent (on a rock-walled foundation), and the Kolb Brother's photographic studio, used to develop pictures of mule-riding tourists.

Cameron collected $20,000 in tolls during 1915, but apparently little money went toward maintenance of a trail that was "in poor condition [and] . . . simply a ditch in many places," or Indian Gardens itself, which was "in a filthy and disgraceful condition" (Johnston and Leopold 1916: 7, 8).

The Forest Service had jurisdiction over Grand Canyon and was interested in development at Indian Gardens. Anticipating a courtroom victory that would oust Cameron, the government and Santa Fe Railway published ambitious development plans. During those years, the Santa Fe Railway built and owned all concession buildings but Fred Harvey operated the concession and owned all the furnishings. The Forest

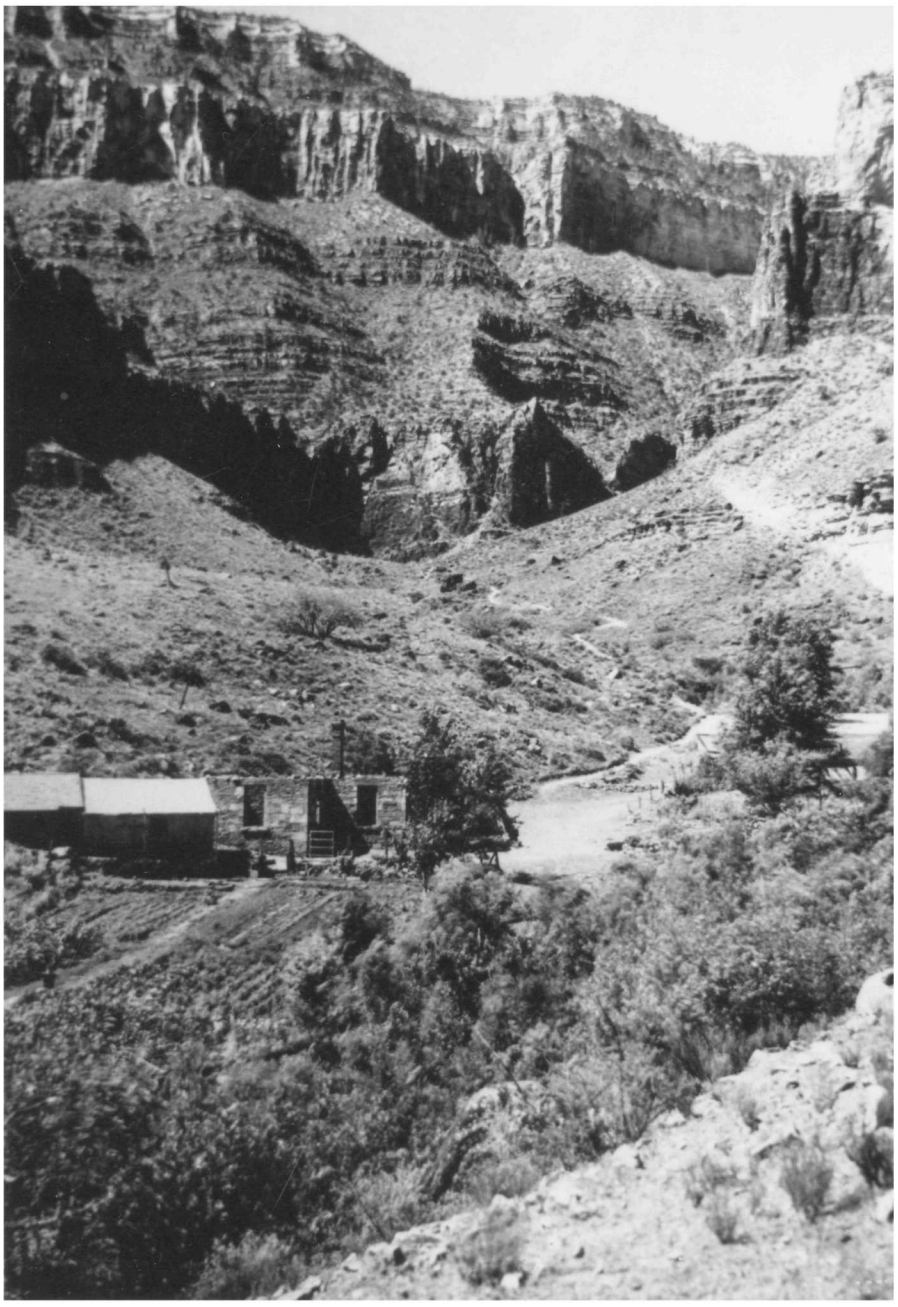


Figure 9

Indian Gardens in 1908, Facing South

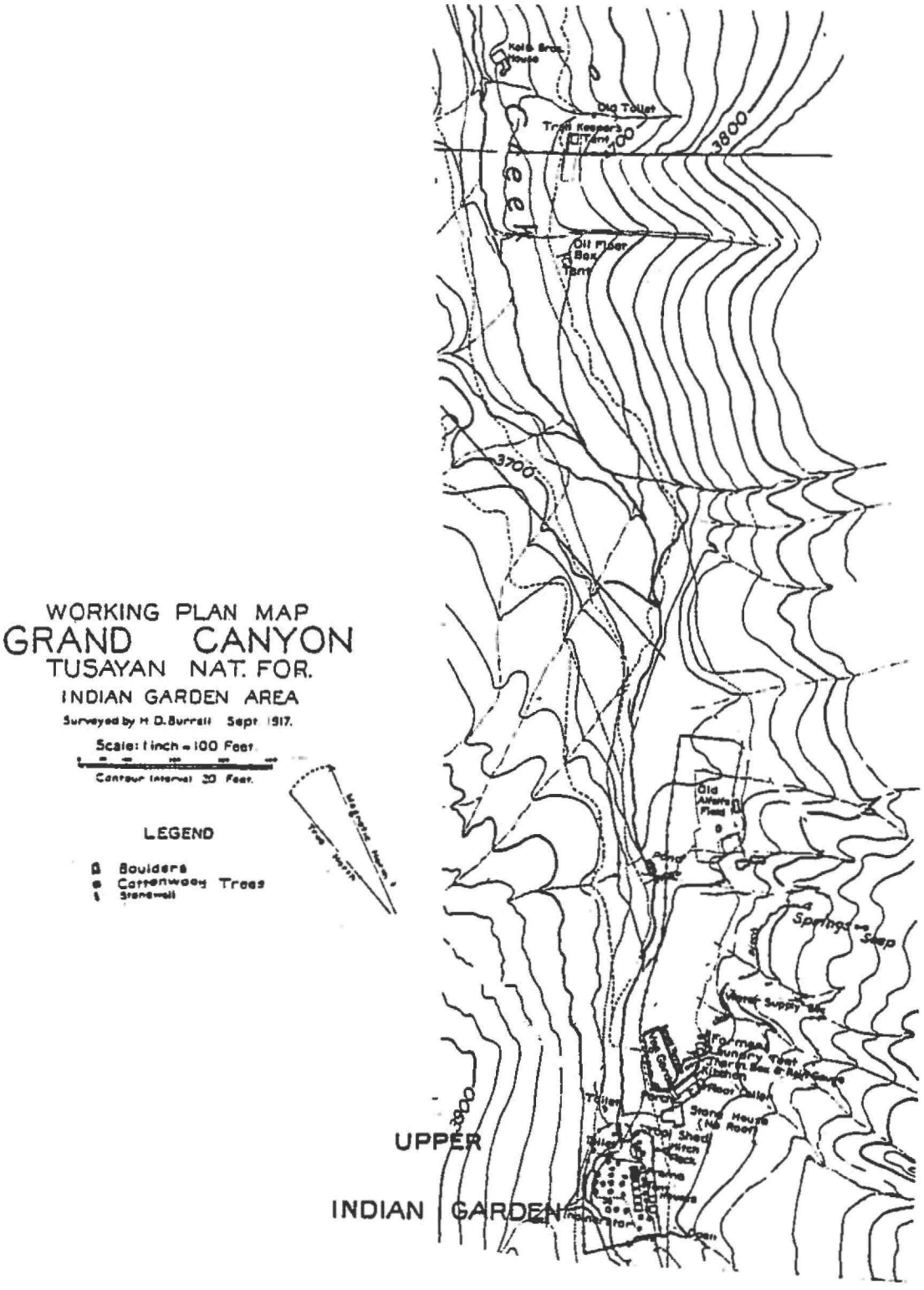


Figure 10

Map of Indian Gardens in 1916. Note Locations of Tents, Stone House, and Trail Maintainer's Tent

Service, and after 1919, the Park Service, who owned the land, directed development; all proposed plans went through government channels for approval.

The 1916 proposal called for a hotel which would be largely self-sustaining, with vegetable gardens, chickens, and cows. It would consist of a central dining hall with large fireplace (Figure 11) surrounded by individual cottages of varying luxury, some with baths and some without (Figure 12). They planned to allow people of limited means to stay in austere quarters, subsidized by wealthy guests paying premium prices for upgraded cabins. The hotel buildings would blend in with the natural surroundings; guest cottages were "to be built against or partially on top of boulders" (Johnston and Leopold 1916: 8, 9). The hand of the railway's architect, Mary E. J. Colter, is clearly evident in these plans. Although the buildings were of different styles, the 1916 model served as a prototype for the 1922 Phantom Ranch development at Bright Angel Creek. Because neither the government nor the Santa Fe Railway could obtain clear title to the land at Indian Gardens, the hotel never moved beyond the planning stage. If not for Ralph Cameron's hold on the trail and Indian Gardens, the whole path of inner canyon development might have been radically different.

Conditions at Indian Gardens had deteriorated by the early 1920s. The unsanitary outhouses contaminated the spring water, thousands of tin cans and trash lay about, and tattered remains of tent frames blew in the wind. The government once again brought suit against Cameron, this time

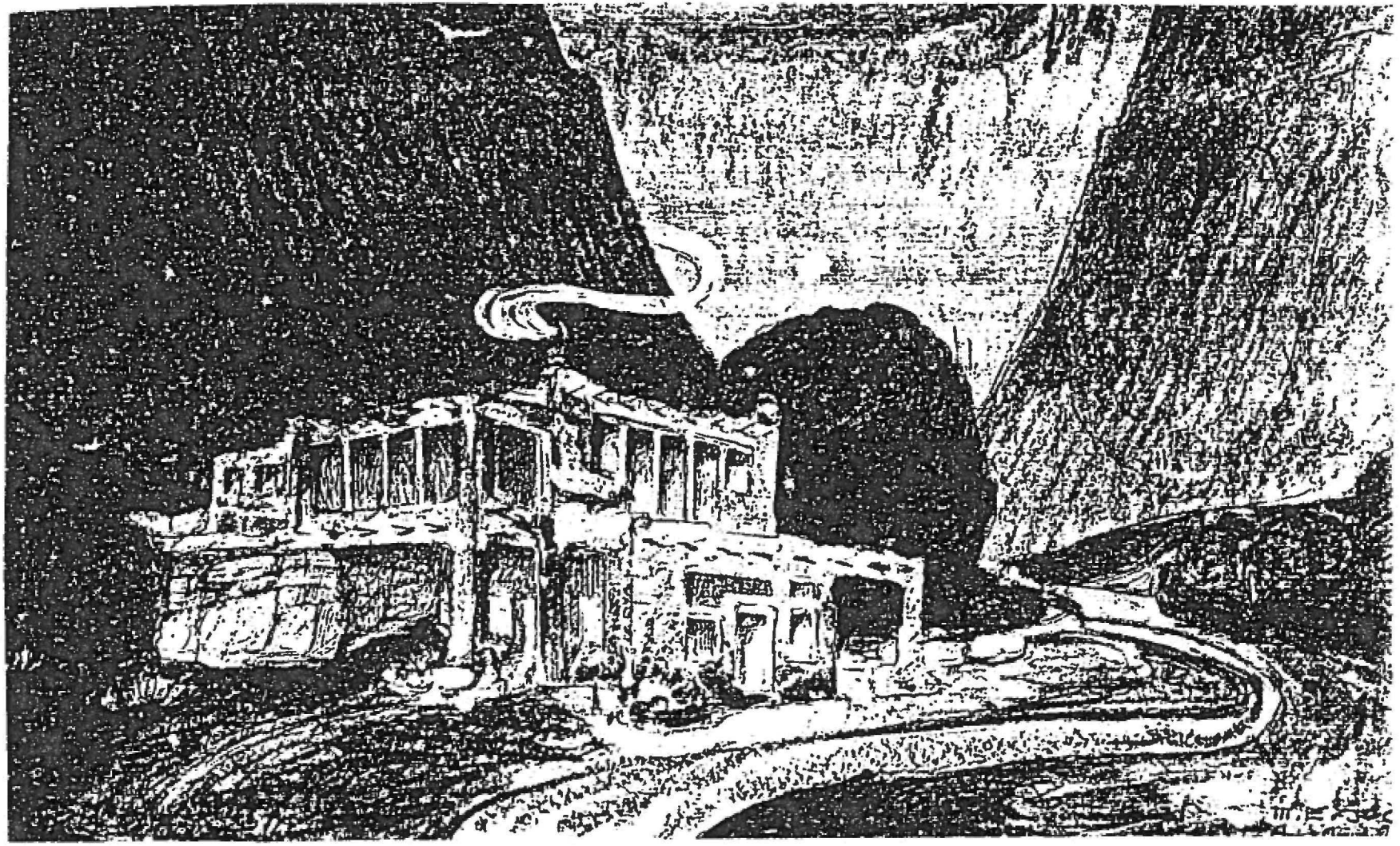


Figure 11

Mary E. J. Colter Drawing for the Proposed Indian Gardens Dining Hall, 1916

Figure 12

Mary E. J. Colter Drawing for a Proposed Indian Gardens
Guest Cottage, 1916

successfully. The National Park Service finally took control of the area in September, 1927. They immediately cleaned it up and installed chemical toilets (Hughes 1978: 94). The Santa Fe Railway again announced plans to build a hotel "similar to the El Tovar" at Indian Gardens (Miami Daily Silver Belt Oct. 10, 1924), but it again failed to materialize. In fact, aside from the general clean-up and removal of tent frames, it appears that little else was done at Indian Gardens for another seven years. Photographs and reports indicate that the roofless stone building and three wood frame buildings remained standing until 1932.

In 1931, Santa Fe Railway initiated construction of a water pipeline from Garden Creek to the South Rim, 3,200 feet and two miles away. A cable tramway ran along the proposed line to about a mile above Indian Gardens, and from there a five-ton tractor hauled materials and workers to the construction site (Harbin 1932: 43). The tramway was removed upon completion of the pipeline in 1932, but foundation remains can still be seen behind Three-Mile Resthouse. Santa Fe Railway used stone in construction of the two pumphouses and reservoir (#s 20, 31, and 32) to blend them with their surroundings. (Figure 13, a map of Indian Gardens today, is keyed to these NPS building numbers.) The company built a residence for the pump caretaker in 1936, but it burned in 1942 and was soon rebuilt on the same spot (SFRR 1942: 70; 1943: 55). The solid stone walls of the present structure (#18) likely reflect the fire protection concerns of Santa Fe and the Park Service.

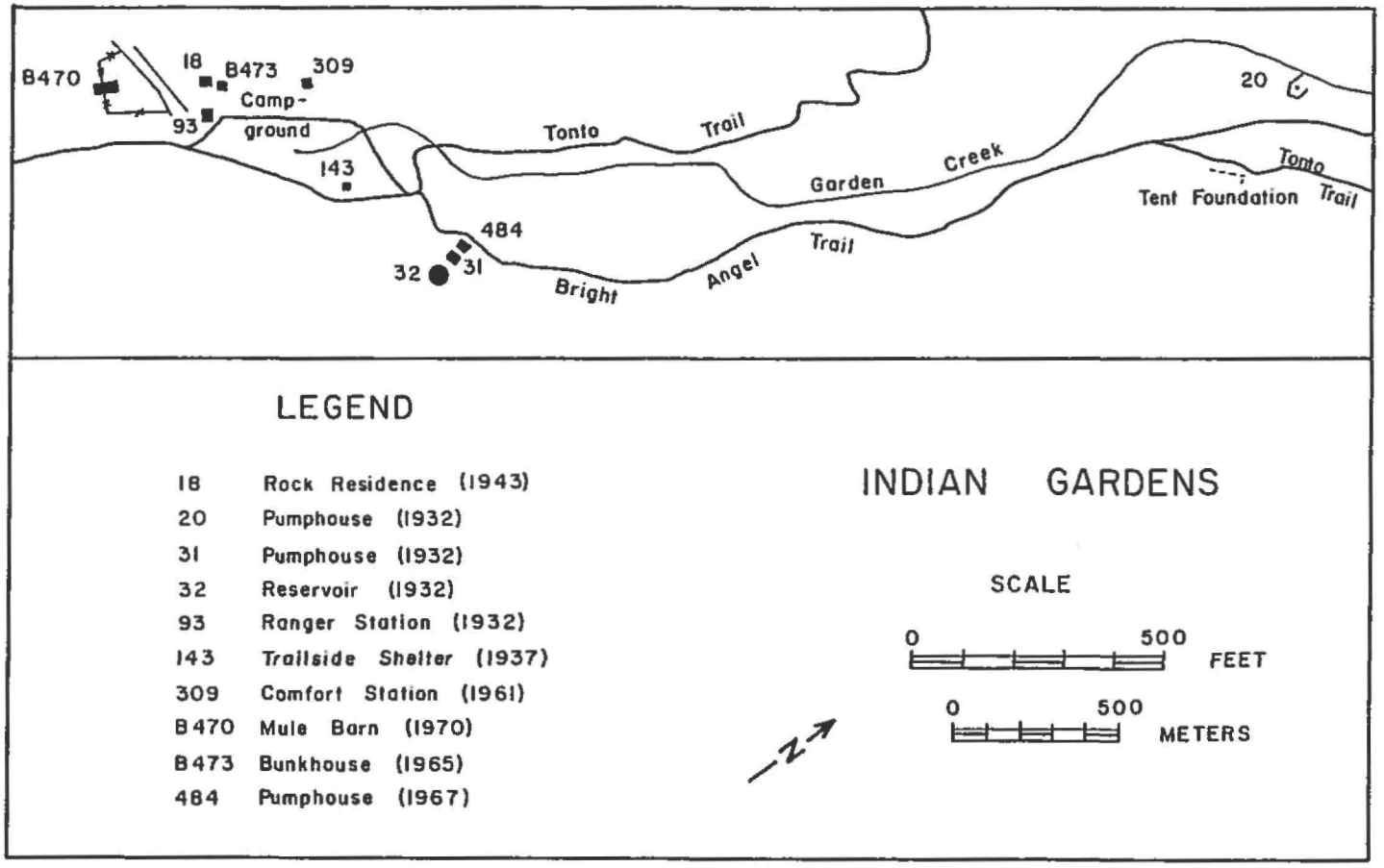


Figure 13

Indian Gardens Today, With NPS Building Numbers and Dates of Construction.

When CCC manpower and funds became available in 1932, the Park Service began to add facilities at Indian Gardens. Crews completed the two-room stone and wood frame Caretaker's Cabin (#93, now the Ranger Station) in October, 1932. At the same time, they removed the old Cameron structures: "the uncompleted stone structure just below was partly demolished by using stone in construction [of the Caretaker's cabin] so that very little remains to eliminate this eyesore entirely" (Langley 1933a: 2). The three wood frame buildings as well asthe old Kolb Studio were also scheduled for removal.

In 1937, CCC crews constructed two more structures at Indian Gardens: the trailside shelter (#143) (Figure 14) and

Figure 14

Indian Gardens Trailside Shelter, 1937

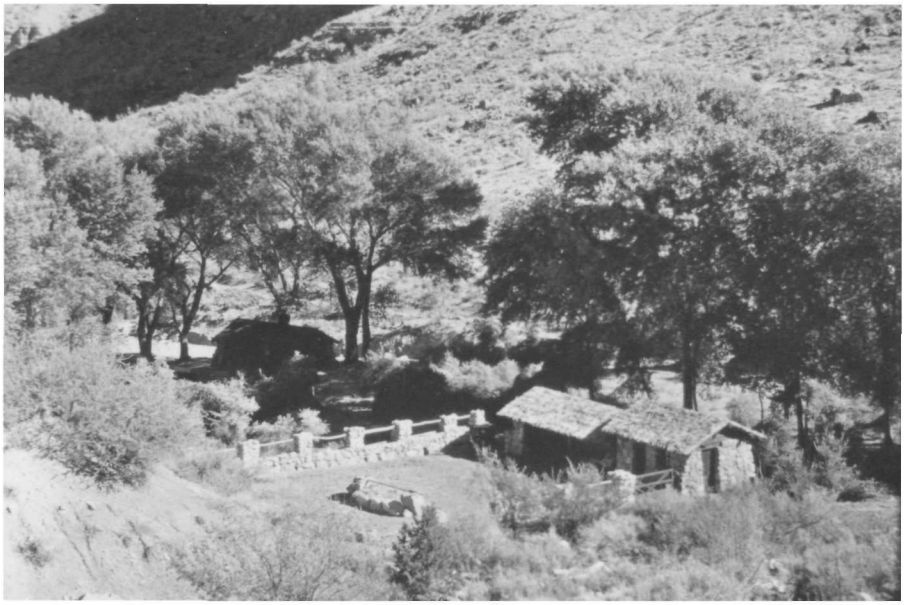


Figure 15

Indian Gardens Mule Barn, 1937

a mule barn and corral (#172) (Figure 15). The barn lay in the path of numerous damaging flash floods and was replaced by a new structure (#B470) in 1971.

The NPS built several new structures at Indian Gardens in the 1960s, including a bunkhouse (B473), a comfort station (now storage, #309), and a new pumphouse (#484). The Ranger Station (#93) received extensive remodeling, including addition of two rooms on the west side, requiring removal of the corner stone piers. Figure 16 shows the physical changes which have occurred through the years at Indian Gardens.

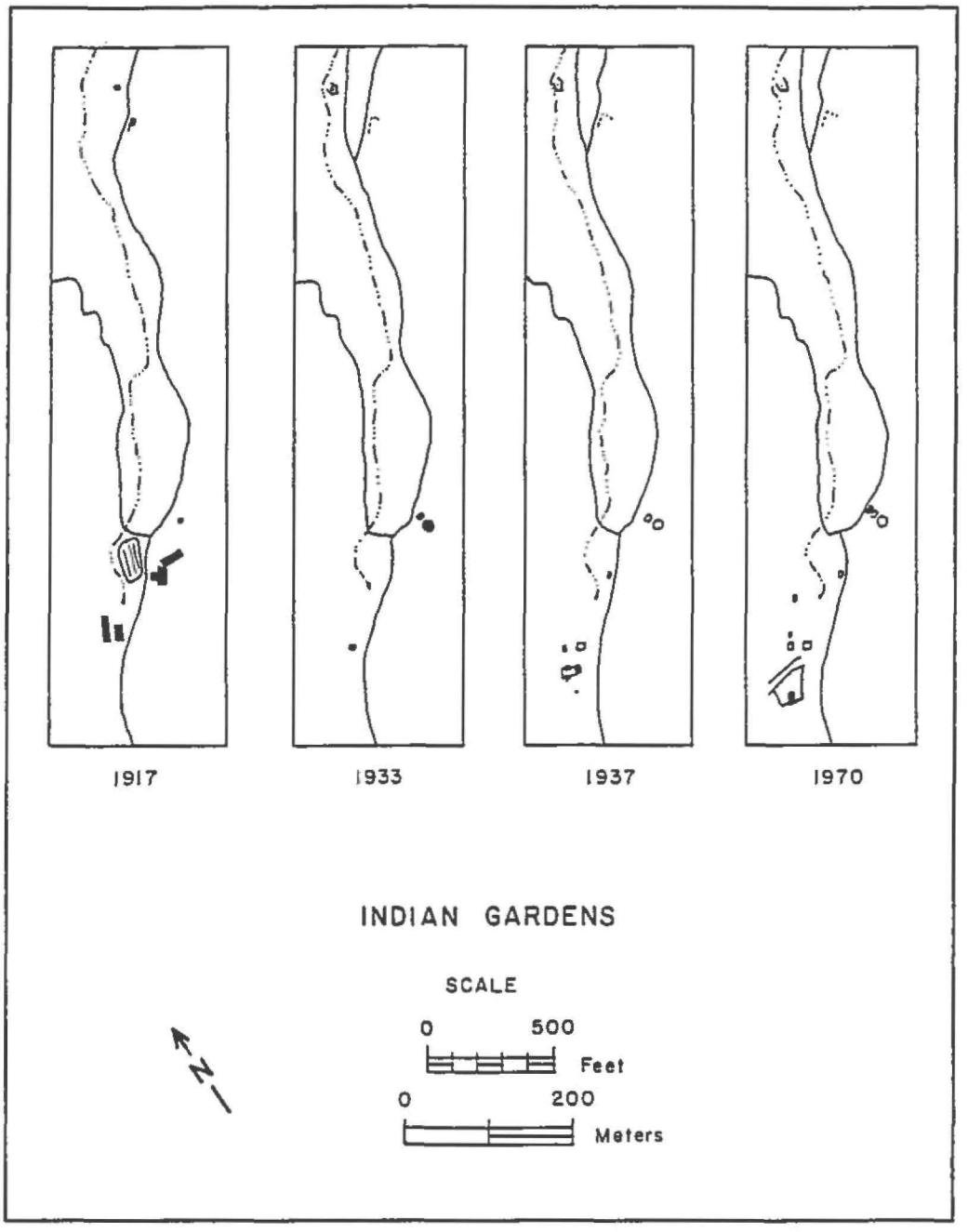


Figure 16

Physical Changes at Indian Gardens for Selected Years.
New Buildings are Shown in Black.

Few features are evident today from Cameron's days at Indian Gardens. Only a few mining adits, the aging cottonwood trees, the trail maintainer's tent foundation, and a storage room built under a boulder remain. Since Garden Creek periodically floods, damaging and even washing away structures, human's hold on the area will always be tenuous.

Cameron was not the only person to profit from tourists' desire to descend Grand Canyon's depths. The delta of Bright Angel Creek, later known as Phantom Ranch, was also developed at an early date for the tourist trade.

Phantom Ranch

Early History

An entrepreneur from the north side of the Grand Canyon, E. D. Wolley of Kanab, Utah, had his own ideas for entertaining the increasing number of tourists arriving at Grand Canyon. He formed the Grand Canyon Transportation Company in 1903 and gave his son-in-law David Rust $5,000 to improve the route up Bright Angel Canyon to the North Rim, thus making rim-to-rim trips possible for mule riders. In 1907, Rust built a cable tramway across the Colorado River where the Kaibab Suspension Bridge stands today (Figure 17). The cable was suspended 60 feet above the water and held a cage large enough for a single mule. People wishing to use the tramway would travel east along the Tonto Platform from Indian Gardens on the old Cable Trail (Hughes 1978: 76).

David Rust set up camp on the east side of Bright Angel Creek near where the Fred Harvey mule barn is now located.

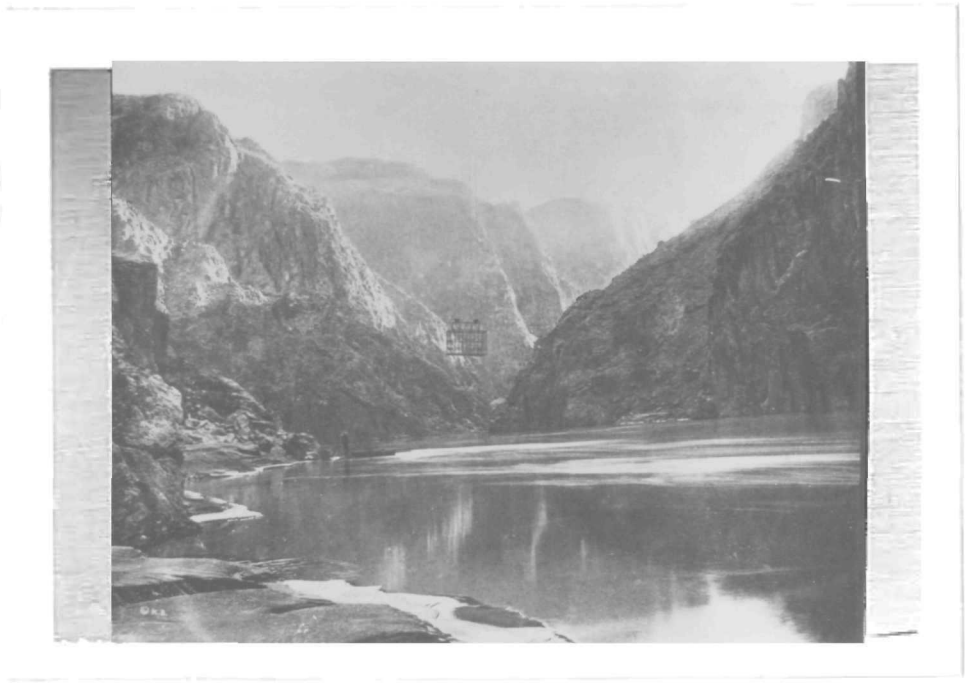


Figure 17

Rust Cable Car at the Colorado River, ca. 1907

He planted cottonwood and fruit trees, watered by an irrigation system, and erected several tents, temporary buildings, and ramadas for overnight guests (Figure 18) (Abbott 1978: 10). Rust apparently did not operate the camp for many years, because when Theodore Roosevelt stayed overnight on his way to a North Rim cougar hunt in July 1913 he found the area deserted (Roosevelt 1978: 194). With Rust gone, the place became known as "Roosevelt Camp".

By 1915, the tramway belonged "to Ex-Governor Wooley of Salt Lake City and [was] known as the Wooley Tramway" (Letter: Reaburn to Mather March 29, 1921). This likely refers to Rust's father-in-law Dee Wooley. The tramway remained in use until the Park Service built a new swinging suspension bridge (Figure 19) in 1921. The present rigid

Figure 18

Rust Camp, ca. 1907

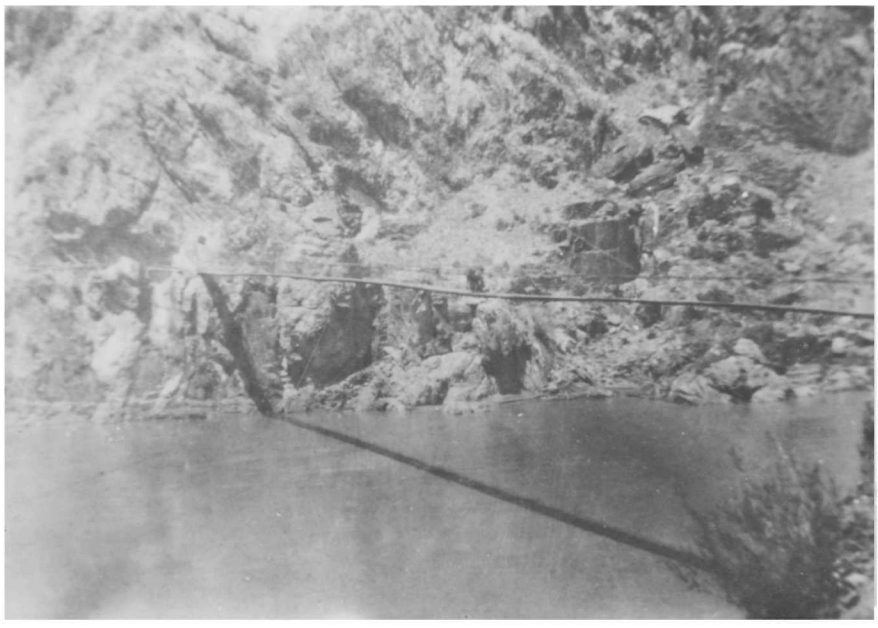


Figure 19

First Colorado River Suspension Bridge, ca. 1922

Kaibab Suspension Bridge replaced the swinging bridge in 1928. The 1921 suspension bridge made tourist travel even easier, and paved the way for a unique dude ranch to cater to their needs.

Fred Harvey/Santa Fe Railroad Concession Buildings

In early 1922, Santa Fe Railway and Fred Harvey announced the construction of a new hotel on Bright Angel Creek called "Roosevelt Chalet" (Northern Arizona Leader Feb. 14, 1922). The development, designed by Mary Jane Colter and built at a cost of $20,000, consisted of "a large combined dining room and restroom, three large cabins with wide sleeping porches for the accommodation of visitors and a caretaker's cabin. . . . The cabins have all the comforts of home--shower baths, running water and telephones" (Kansas City Star July 2, 1922). The cabins, described as "stone Swiss chatelets" were actually more in the Craftsman Bungalow tradition. Each large room contained two beds, a fireplace, and by 1927 had generator-powered electricity (Kansas City Star Jan. 23, 1927).

Colter renamed the place 'Phantom Ranch' after a nearby canyon, which evoked romantic images of ghouls and ghosts. According to a newspaper reporter, "Phantom Ranch is so called for the excellent reason that it has a phantom. . . . The phantom appears at night on the face of the mountain. It is white as all phantoms are and has something of the shape of a veiled human figure" (Kansas City Star Jan. 23, 1927). Actually, Phantom Canyon may have been named for the

unromantic reason that the original 1902 cartographers led by Francois E. Matthes found the canyon so narrow that its convolutions would suddenly appear and disappear on their topographic maps. Other tales tell of John Wesley Powell's ghost wandering the canyon at night, or of a mystical mist that envelopes Phantom Canyon's mouth.

When it first opened, Phantom Ranch looked quite different than it does today. It was far smaller, with only five lodge buildings (#s 883, 888, 889, 891, 892), a water reservoir (#898), and barn (no longer extant). (Figure 20, a map of Phantom Ranch today, is keyed to these NPS building numbers.) The tall cottonwood trees which today provide shade and give the ranch a lush appearance had just been planted then, and the Phantom landscape was desert-like. Designed to provide many of its own needs, the ranch soon had an orchard of peach, plum, and apricot trees, a chicken shed and yard, and a blacksmith shop. All are now gone--the orchard neglected and the chicken shed and blacksmith shop buried under a landslide. The National Park Service recently planted a new orchard of seedlings near where the old one was.

The two-day Fred Harvey mule trips from the South Rim to Phantom Ranch (all expense paid price: $19) soon became popular, and to accommodate more guests, the company began to expand its facilities. Additions in 1925 included: four tents, each accommodating four people, located where the hiker dorms (#s 899, 900, 901, 902) are today, a wooden bathhouse with dressing rooms, built behind the tents (#895,

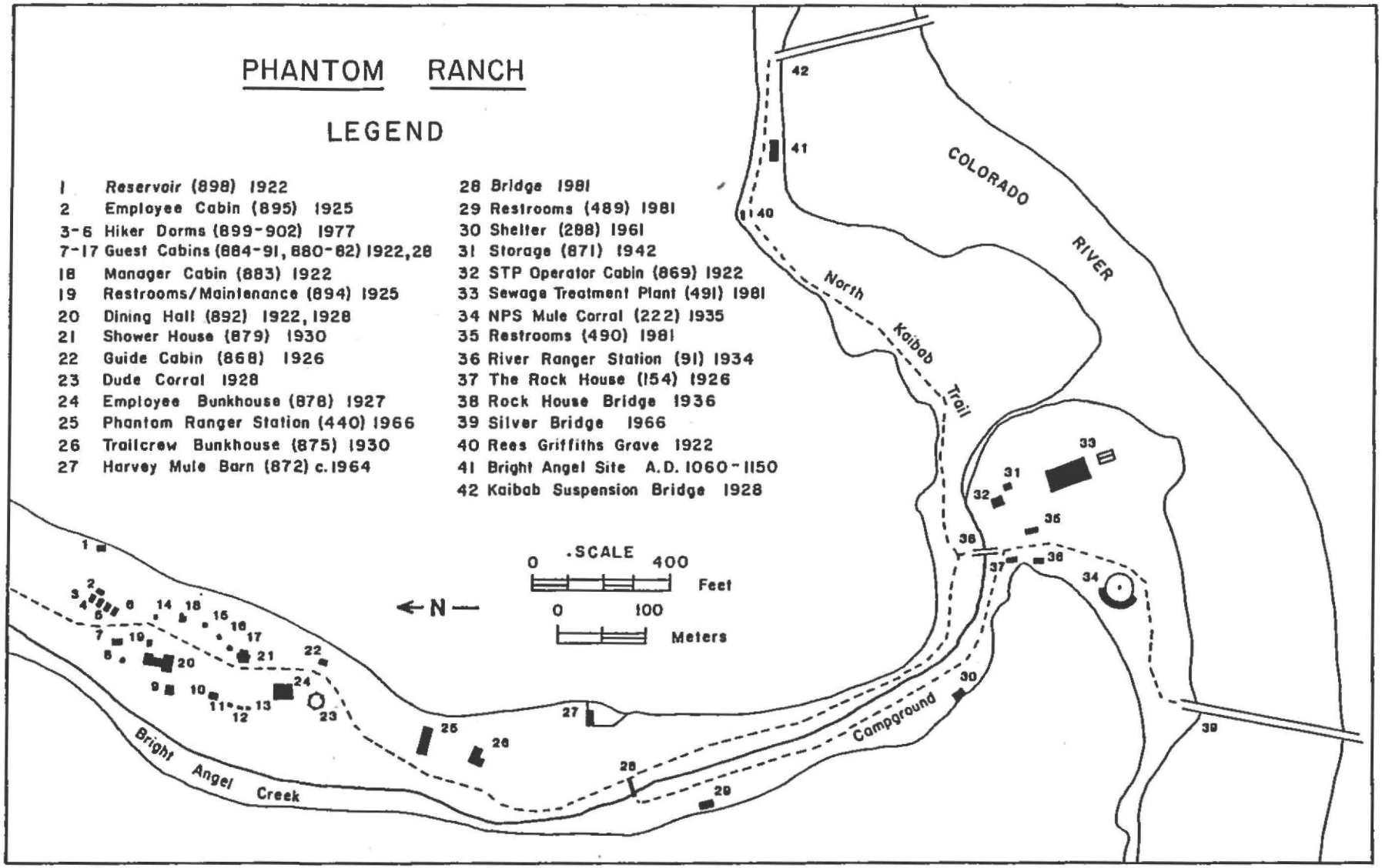


Figure 20

Phantom Ranch Today, With NPS Building Numbers and Dates of Construction.

now employee housing), two toilets on the bank of Bright Angel Creek (now gone), a combined coal and wash house (#894, today's hiker restrooms), and a hay shed (now gone) (letter: Harvey to Eakin Dec. 5, 1924).

In 1926, a Delco Light Plant (#868) provided electricity for the ranch. This was an open sided structure with rock piers, built to cover the machinery. Since enclosed, it serves as quarters for the mule guides today.

In 1927 the Fred Harvey Company added a large recreation building (#878) and three adjacent stone and wood frame two-bed guest cabins (#s 885, 886, 887) to the ranch. The following year they built five more of the small two-bed cabins on the same basic plan (#s 880, 881, 882, 884, and 889), the stone and pole corral used today to welcome mule riders, and doubled the size of the dining room with a southern addition (Figure 21) (letter: Vint to Tillotson Aug. 19, 1928).

Today's ranch guests dine in the 1928 dining room addition. The original dining room is today's kitchen, and the original kitchen is now the employee dining room (Keith Green, personal communication, 1985). The building had two entrances: one for guests and another for employees. The employee entrance remains the same, but the foyer which was once screened is now enclosed. Guests entered on the east side of the building, where the registration window is today. The west side of the dining hall was a focus of activities for guests, who relaxed there beside the creek (Figure 22).

Figure 21

Phantom Ranch Dining Hall Addition in Foreground, 1928 Guest Cabin at Far Rear. Facing North, Photo ca. 1961

Figure 22

West Side of the Dining Hall, Phantom Ranch Facing South, ca. 1923

With all the new facilities accommodating increasing numbers of guests, the Park Service became concerned that sewage facilities (largely comprised of pit toilets) might be inadequate for demands. In response, Santa Fe Railway installed a six-inch sewage pipe supported in places by rock piers running from Phantom Ranch to the Colorado River west of Bright Angel Creek, where they dumped raw sewage (Phantom Ranch Development Outline 1936). By 1946, septic tanks were installed to handle the problem. The stone piers, seen today along the west canyon wall, also carried water pipelines leading from huge holding tanks located up in the cliffs to government buildings on the creek delta.

In 1930, the last major concession buildings were erected at Phantom Ranch: the large stone-sided toilet/bathhouse for men and women (#879) and the mule guide's living quarters (#875). A long rock wall ran from the guide's quarters along the North Kaibab Trail down to the mule barn. Wranglers would let the mules run free within this large enclosure. With completion of these buildings, Phantom Ranch looked much like it does today.

The CCC built a swimming pool north of the recreation building in 1934. Located in a flood plain filled with huge boulders, they excavated the pool by hand; a massive undertaking indeed (Figure 23). The waters of Bright Angel Creek, cascading over a small waterfall, fed the pool (Langley 1934: 2). The CCC enrollees themselves reaped the benefits of the finished pool, and it was a Phantom Ranch centerpiece for many years (Figures 24 and 25). With increasingly heavy use

Figure 23

Excavating the Swimming Pool, 1934. Facing South, Note the Recreation Hall (#878) in Rear

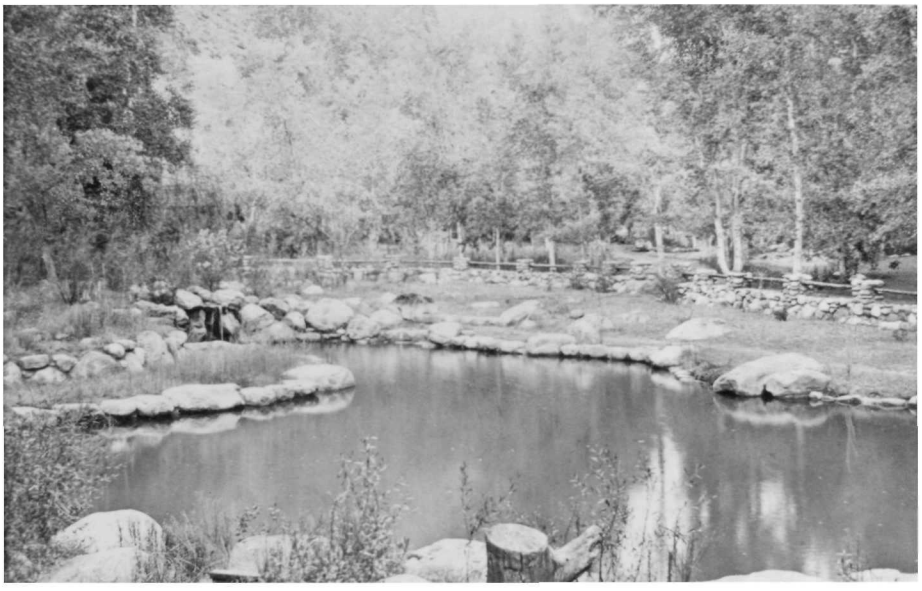


Figure 24

Finished Swimming Pool, 1936, Facing North

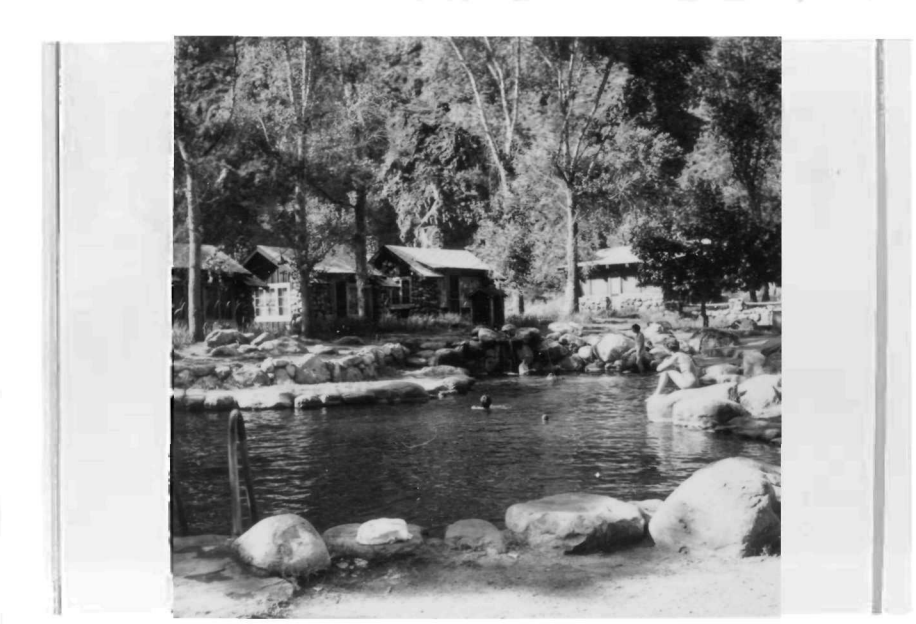


Figure 25

The Phantom Ranch Pool, ca. 1961. Note Cabins in Rear: 1928 Cabins Left, 1922 Cabin (#891) Right

through the 1960s, the pool became a maintenance and health problem. In 1972, the National Park Service permitted the Fred Harvey Company to fill it in. Many items were reportedly thrown in, including hand carved doors from the recreation hall, a pool table, a piano, old oil burning stoves once used to heat the cabins, campground grills, and items from the old blacksmith shop (Abbott 1978: 20). The area may be a rich field for archaeological endeavors.

Other changes at Phantom Ranch have been relatively minor. The showerhouse (#879) was originally built with board-and-batten side and end walls. In 1947, the Santa Fe Railway spent some $6,000 to "restore" the building, and it is likely that the walls were filled in with rocks at that

time (AT & SFRR: n.d.). The original barn of board-and-batten burned down in about 1964 and was soon replaced by the present stone structure. The Santa Fe Railway converted showers to toilets in most of the guest cabins in 1946 (#s 880, 881, 882, 884, 888, 889, 890, 891). The alterations changed the appearance of the 1928 cabins little, since the small board-and-batten cubicles built into external walls were simply enlarged. The 1922 cabins required more extensive remodeling (NPS Drawing #8727). The remaining three 1927 guest cabins (#s 885, 886, 887) received similar additions in about 1974. All the cabins also had evaporative coolers in place by 1946, which further altered their appearance.

In 1974, a laundry room was added to the west side of the dining hall (Fred Harvey file C-3823). The Fred Harvey Company removed that addition and constructed a new laundry building west of the dining hall in March, 1986. The large walk-in cooler which dominates the north elevation of the dining hall was installed in about 1964 (Buck Acuff, personal communication, 1985).

A number of changes took place at Phantom Ranch in 1977. The original 1925 tent frame units were removed and replaced by prefabricated structures of the same proportions (#s 899, 900, 901, 902). These new 'hiker dorms' have five bunk beds each, a bathroom with shower, electricity, heating, and cooling (Figure 26). The adjacent wash house (#895) was remodeled into employee quarters. A major renovation of the

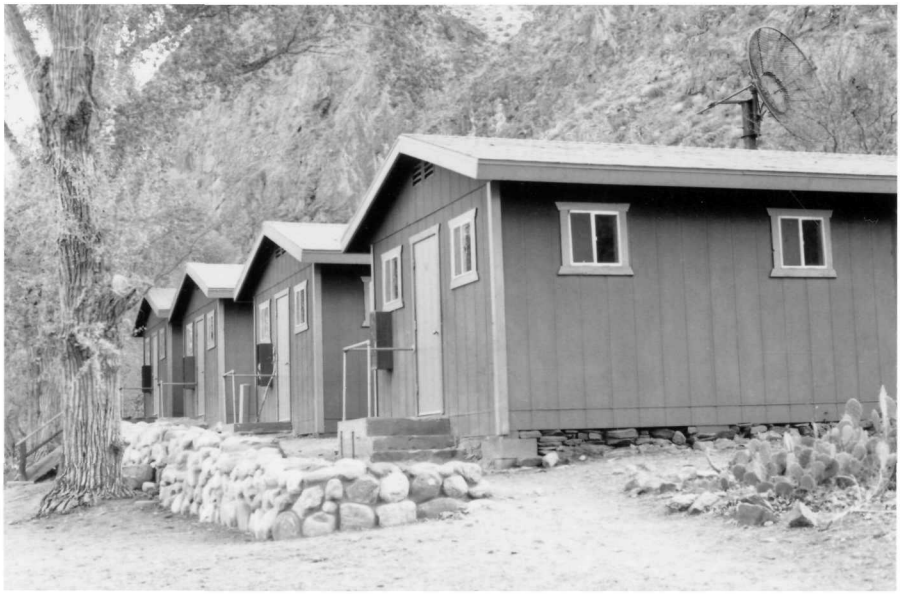


Figure 26

Phantom Ranch Hiker Dorms, Facing North, 1985

old recreation building into an employee bunkhouse involved enclosing the north and south porches for bedrooms and moving the baths to the building's center from the east end (Fred Harvey file C-3823). The old open-sided Delco Light Plant, made obsolete in 1966 by a power line which ran along the transcanyon waterline from Indian Gardens, was enclosed and made into the mule guide's quarters (Keith Green, personal communication, 1985). The Fred Harvey Company recently completed a bathroom addition on the west side of this building.

United States Government Structures

While private enterprise flourished half a mile up Bright Angel Creek, the U.S. Government began constructing buildings at the creek delta on the Colorado River. The

United States Geological Survey (USGS) first broke ground there in the fall of 1922. They installed river level gauging equipment, including a 50 foot high recorder tower and 410 foot span cable set sixty feet above the water. These can be seen today, just east of the Kaibab Suspension Bridge. They also built a small residence nearby for their hydrographer.

The Park Service rebuilt the last two miles of the old Cable Trail to transport building materials and equipment, and renamed it the Kaibab Trail (it was completed to the top in 1925). After descending the steep, twisted trail, workers had to cross the original precariously swinging suspension bridge. For these reasons, mule loads had to be under six feet long and weigh less than 150 pounds (Figure 27). It

Figure 27

Packing in Supplies on the South Kaibab Trail, ca. 1922

took over 800 mule-days to pack materials down to the site. Eight men carried the gauging cable down the trail, assisted by a mule at each end (USGS file 09402500: n.d.).

The National Park Service supervised the landscape architecture aspects of construction. It is evident that NPS desired the built environment to be subordinate to the natural one: "The recorder tower is reinforced concrete construction, the exposed walls being faced with granite spalls. The facing being an attempt at artistic finish because of the Park Service landscape engineer's objection to concrete finish for structures within the Park" (USGS file 09402500: 7).

The Colter buildings at Phantom Ranch set a precedent for later construction in the canyon. The Park Service suggested that the USGS model their employee residence after the manager's cabin at Phantom Ranch, and the original 12 by 14-foot stone and wood frame cabin (#869) appeared quite similar (Figure 28, Letter: Hoyt to Ebert Oct. 24, 1922). By 1927 a stone and wood-frame screened sleeping porch had been added to the south end of the cabin. Another small board-and-batten bathroom addition was built onto the west side in about 1977.

The NPS completed a telephone line down into the canyon in February of 1922 (Northern Arizona Leader Feb. 14, 1922). The single-wire line set on rocks and trees provided rapid communication for Phantom Ranch guests and the USGS hydrographer (Letter: Rice to Crosby Feb. 21, 1923). The single circuit line was soon taxed by growing demand, so in 1935 the

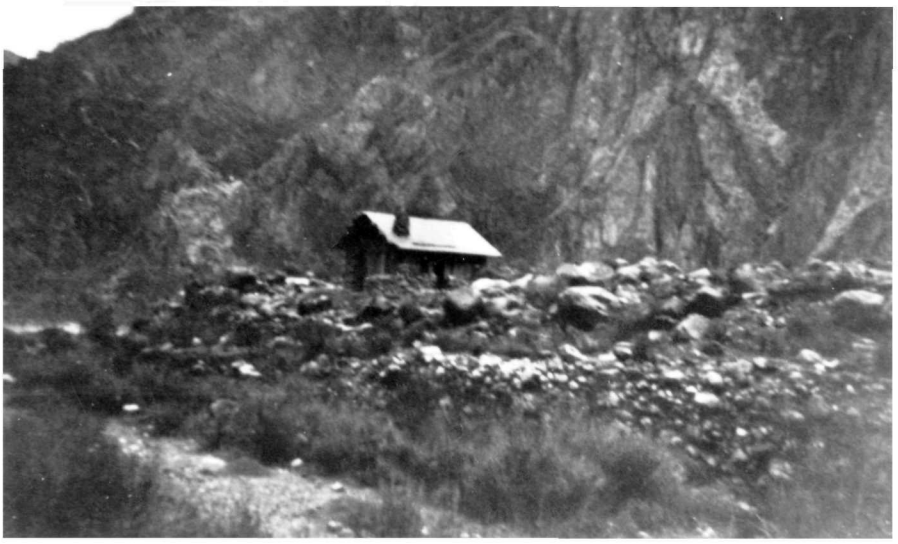


Figure 28

The USGS Hydrographer's Cabin, ca. 1922

CCC completely rebuilt it, adding another circuit. Now three conversations could take place over the line because a third or 'phantom' circuit resulted from interaction between the two metallic wires. The telephone line, upgraded in 1939, is still used today (Study Collection Catalog #660.04: 1939). Some of the two-inch-pipe poles, fashioned for the rugged canyon, are used to hang packs upon in the Indian Gardens and Bright Angel Campgrounds. They came from an obliterated telephone line section which ran along the north side of the Colorado River from River Rest House to Phantom Ranch (Marvin Hanchett, personal communication, 1985).

In 1926, the USGS added a combination bathhouse and storeroom (now gone) outside their residence (letter: Hull to

Eakin Dec. 19, 1925). In that same year, NPS erected their first permanent structure nearby, a single room residence known as the Rock House (#154, Figure 29) (Building Inspection Form: 1943).

Once the CCC moved their winter camp to Phantom Ranch in late 1933, development increased. The workers first had to build for themselves a campground (which would later become the public Bright Angel Campground), choosing the west side of the creek for its location. They moved boulders, graded the bank level, planted cottonwood trees complete with irrigation system, built a rock-walled restroom (#182, now gone) and moved in tents and temporary buildings (Langley

Figure 29

The Rock House, 1936. The CCC Crew is Surveying the Location for the Rock House Bridge

1933a: 3). An average of about 200 young men lived in tents set in a double row (44 in all) and ate in a huge mess hall (Haines 1933: 1). In 1934, recreational activities included basketball, baseball, volleyball, music classes conducted by the blacksmith, and the most popular attraction: old silent films shown "in the most picturesque and unique picture show auditorium in the world. . . . The only music is furnished by the clear, swift moving Bright Angel Creek" (CCC 1934). The recreation hall had a small library, jigsaw puzzles, chess and checkerboards, domino sets, playing cards, and a radio. In 1934 the Phantom Ranch CCC camp received an award as the best of the 54 camps in the Arizona-New Mexico district (CCC 1934).

The CCC erected a cable tramway across the Colorado River west of the delta as a means of gathering driftwood from a sandbar on the far side. This tram later became useful for transporting men across the river to work on the River Trail (Haines 1933: 4). Completed in 1936, the two mile long River Trail linked the Bright Angel and Kaibab Trails, and made loop trips from the South Rim possible.

The CCC built the Packer's Cabin (#91, now the River Ranger Station) in 1934, on the same plan as the Rock House. The NPS Branch of Plans and Design occasionally used standard plans to create similar structures, particularly during the busy years of CCC construction (Tweed, Soulliere, and Law 1977: 97). Small shed-roofed bathroom additions were soon built on to each of these structures (NPS Drawing #G.C. 3146). Both buildings have been enlarged considerably with

additional rooms, probably in the early 1960s. The Youth Conservation Corps added new restrooms to both structures in 1977 (David Buccello, personal communication, 1985).

In 1934, the USGS built a second gauge well slightly upstream and across the river from their recorder tower. The CCC constructed a short trail leading from the Kaibab Suspension Bridge along the north side of the river to a cable used for transporting the hydrographer across to the new well (letter: Dickenson to Tillotson Nov. 4, 1933). They erected a stone and wood frame silt laboratory (#870) south of their employee's residence in 1935. The lab burned in 1946 and the USGS replaced the superstructure in 1947. In that year they also built a small storeroom (#871) nearby (USGS Correspondence 1935 and 1947). In 1948, the renovated lab was converted into a residence and the old residence became the lab. On April Fools Day 1966, the lab/residence (#870) again burned and this time was destroyed. The USGS moved to a new lab and residence (#440, now the Phantom Ranger Station) up Bright Angel Creek and donated the old residence (#869) and storeroom (#871) to NPS. The residence is now home to the Sewage Treatment Plant (STP) operator. The storeroom served as a restroom for a time and was recently converted back into a storeroom. In 1977, satellite relay of river levels began and soon the USGS completely vacated their last remaining structure (#440) and donated it to the NPS (Gene Buell, personal communication, 1985).

The CCC built the NPS mule corral near the Colorado River in 1935 (Figure 30). The wooden roof and supports burned in 1937, but were soon replaced (Tillotson 1937).

In 1936, the crews constructed two bridges over Bright Angel Creek. Both had massive stone piers from which bridge support cables were strung (Kuehl 1936). The upper bridge, crossing to the campground, was washed away by floods years ago, but the original stone piers of the bridge leading to the Rock House still stand.

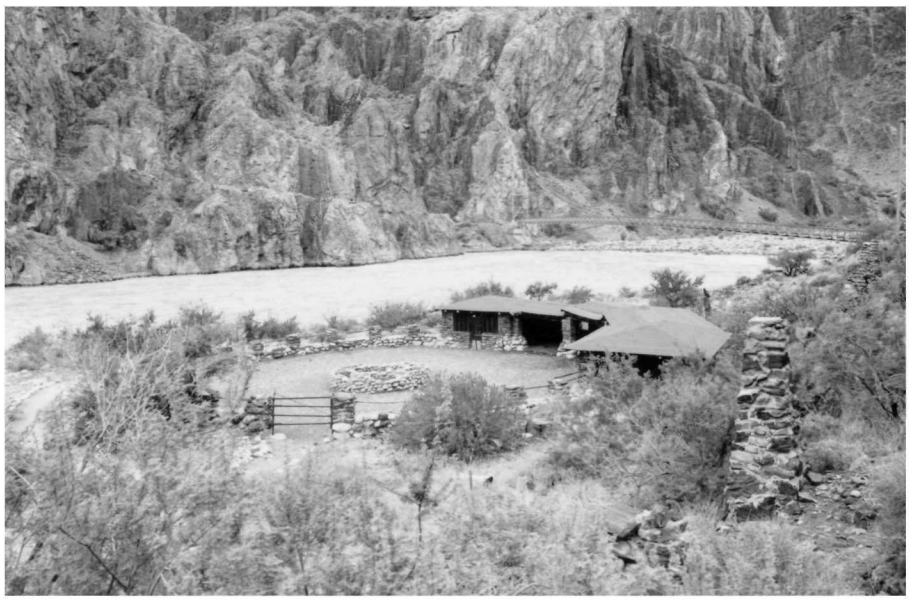


Figure 30

The Phantom Ranch Mule Barn Today. Note the Rock Pier for the Sewer Line, Right Foreground

The 1950s saw no new construction in the delta area. In late 1960 and early 1961, NPS renovated the Bright Angel Campground by adding new grills and picnic tables, rehabilitating the original CCC-built comfort station, and building a three-bay hikers shelter (#288) called the Adirondack Shelter (Building Inspection Form: 1961).

A pipeline for transporting water to the South Rim from Roaring Springs (some nine miles north of Phantom Ranch) was installed in 1965 and 1966. Although the pipeline ran underground, a sturdy aluminum bridge to carry it across Bright Angel Creek was built into the original rock piers of the Rock House Bridge. The new silver suspension bridge, located where the old CCC tramway was, supported the line as it crossed the Colorado River. Providing hiker passage was only an incidental use for this bridge (Hughes 1978: 110). As the pipeline neared completion in December 1966, an immense flash flood swept through the canyon, washing away the campground restroom, upper campground bridge, cottonwood trees, and severely damaged the old Phantom Ranch guide's quarters (#875). The pipeline itself required several more years to complete, and it did not operate until 1970.

By 1980, increased visitation had strained the old sewage system of septic tanks and leach fields beyond capacity. In 1981, a new sewage treatment plant (#491) was built on the Bright Angel Delta. Two new restrooms, one at the campground (#489) and the other opposite the River Ranger Station (#490), as well as a new campground bridge to carry the sewer pipe, were built at the same time (GCNP 1980). The

damaging effects of the 1966 flash flood and installation of the 1981 sewer line took their toll on the old Bright Angel Campground, so the Park Service rebuilt it in 1982 (David Buccello, personal communication, 1985).

The latest NPS addition to Phantom Ranch is a small amphitheater of benches supported by rock piers. Built in 1984, visitors enjoy interpretive talks in the amphitheater.

Figure 31 shows how the physical appearance of Phantom Ranch has changed through the years. The architectural landscape of the inner canyon is dynamic and it will continue to reflect the changing needs of those who use it. In the Grand Canyon, where the built environment is subordinate to the natural one, the architecture harmonizes with its setting. The uniquely American style employed in the canyon is discussed in the next chapter.

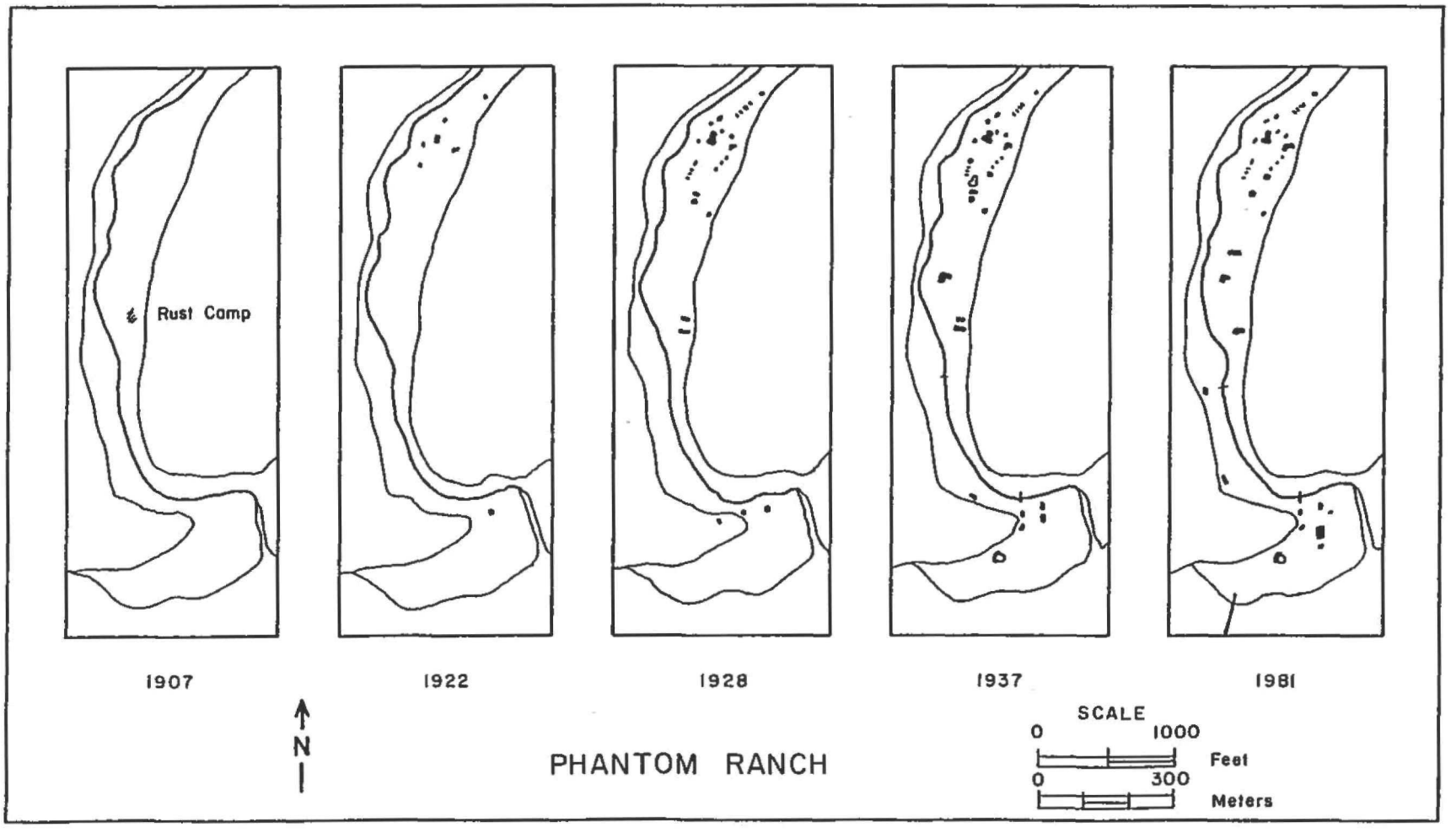


Figure 31

Physical Changes at Phantom Ranch for Selected Years

Chapter 3

DISTRICT ARCHITECTURAL EVOLUTION

Introduction

The National Park Service was only three years old when Grand Canyon National Monument became a Park in 1919. Founder Stephen Mather and his assistant Horace Albright organized the new agency and set policy during its initial years of operation. The first NPS "Statement of Policy", written in 1918, reflects their philosophy of park development. One section addressing building construction outlined the path that development would take over the next 20 years:

> In the construction of roads, trails, buildings, and other improvements, particular attention must be devoted always the harmonizing of these improvements with the landscape. This is a most important item in our programs of development and requires the employment of trained engineers who either possess a knowledge of landscape architecture or have a proper appreciation of the esthetic value of park lands (quoted in Tweed, Soulliere, and Law 1977: 23).

Rustic Architecture

Since Congress created National Parks for visitor appreciation of natural beauty, it was fitting that Park architecture harmonize with the landscape. In the 1920s and 1930s, architects from the NPS Branch of Plans and Design developed a distinct architectural style known as "NPS Rustic". A 1935

NPS publication written to train new designers and architects in the style defined it as follows:

> Successfully handled, rustic is a style which, through the use of native materials in proper scale, and through the avoidance of rigid, straight lines, and over-sophistication, gives the feeling of having been executed by pioneer craftsmen with limited hand tools. It thus achieves sympathy with natural surroundings, and with the past (quoted in Tweed, Soulliere, and Law 1977: 93).

Rustic is a distinctly American style which grew from the landscape and history of the western United States. Its roots can be traced to the work of American architects and landscape architects of the mid- to late-1800s like Andrew Jackson Downing, Frederick Law Olmstead, Jr., and H. H. Richardson. They rejected the popular European styles then being built in the populous American cities and instead designed structures which related well to their environment. Their buildings incorporated natural materials (like stone and wood), were scaled to their setting, and landscaped.

California during the late 1800s was the perfect setting for growth of these naturalistic ideals. Creative and receptive architects like Charles and Henry Green, Irving Gill, and Bernard Maybeck designed for their wealthy patrons elaborate homes which were, nevertheless, organically tied to the landscape. After the turn of the century, designer Gustav Stickley introduced the Craftsman design tradition, which called for informal simplicity in interior and exterior home design and integration into the surrounding landscape. He designed affordable homes for the common family, which may account for their explosive popularity (Sanders 1979: v).

Craftsman structures employed natural materials like wood and stone, and often seemed to rise organically from the ground through the use of battered stone foundations and columns. Pergolas invited plants to become part of the building and sun porches brought the outside in. Low eave lines and horizontal designs further strengthened the relationship between structure and setting. Open spaces and mild climate favored development of the Bungalow style and its many variations. Although designs were naturalistic, they often incorporated decorative detailing borrowed from other styles, including the popular variations of Oriental, Tudor, Colonial, Prairie, and, as in the Grand Canyon, Swiss Chalet (Kahn 1983: 280). The Craftsman movement was the precurser of the National Park Service Rustic architectural style.

An unusually talented young woman studied architecture and design in San Francisco during this exciting period in American architecture. She was Mary Elizabeth Jane Colter, the Fred Harvey/Santa Fe Railway architect and designer who created a number of unique structures at Grand Canyon, and strongly influenced the development of NPS Rustic.

Colter was born in Pittsburgh, Pennsylvania in 1869 and moved with her family to Texas and Colorado before settling down at age 11 in St. Paul, Minnesota. She became interested in Sioux Indian artwork as a girl, and Native American designs would later appear in much of her work. In 1887, at the age of 18, she moved to San Francisco to attend the California School of Design. She received further training

while apprenticing at a local architect's office. After graduating, Colter returned to St. Paul, Minnesota to teach freehand and mechanical drawing at the Mechanic Arts High School. She finally began her long career with the Fred Harvey Company and Santa Fe Railway in 1902 (Grattan 1980). The largest surviving group of buildings she designed for them is located on the Grand Canyon South Rim.

Colter's South Rim buildings respected both the natural and cultural landscape of the area. Hopi House (1905) authentically recreated a modern Hopi pueblo, while The Lookout (1914) was a romantic interpretation of a prehistoric ruin. Colter meant Hermit's Rest (1914) to appear as if a prospecting hermit had built it himself with naturally available materials. The Desert View Watchtower (1932) was Colter's idea of what prehistoric Indians might have built had their culture continued to create ever more elaborate structures. All of Colter's designs, though romanticized, blend well with the environment because they reflect local architectural traditions, which incorporated natural materials.

The Architecture of Phantom Ranch

Because the Santa Fe Railway built Phantom Ranch (1921) to accommodate mule riders, Colter's design recalled a western ranch with central lodge and scattered 'dude' cabins. She designed the stone and wood frame buildings, each one distinct, in the then popular Craftsman bungalow style (see Figure 32). Huge boulders were often used in foundations,

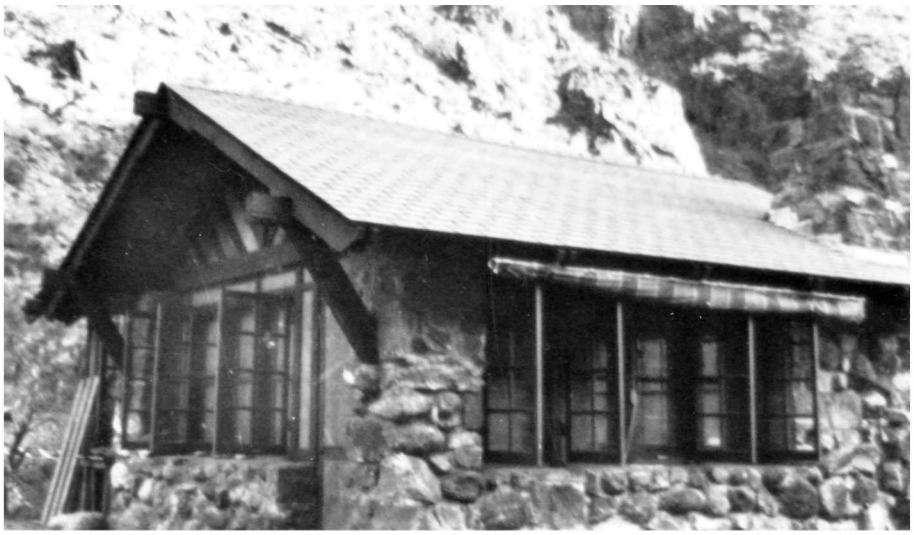


Figure 32

This 1922 Photograph of the Phantom Ranch Manager's Cabin Illustrates a Typical Colter Building. Note the Casement Windows, Awning, Exposed Double Rafter Ends, Decorative Purlins, Brackets Resting on Rock Projections, the Chevron Pattern Board-and-Batten Gable End, and Rusticated Masonry

and the battered walls of native rock lent an organic appearance to the cabins. Low gables with overhanging eaves and shed extensions gave the structures a horizontal expression and further rooted them to their setting. Other Craftsman details included: multiple-light casement windows, screened porches, exterior chimneys, and exposed rafters with knee braces. The walls of angular native rock displayed a wide variety of color and texture since masons used rock which had eroded from many canyon formations.

Later buildings at Phantom Ranch incorporated greater amounts of wood board-and-batten siding and rounded river cobbles for walls and piers. The small cabins, identical in

plan, were not as aesthetically pleasing as the originals, but probably took less time to build, thus making them lower in cost. The seemingly random orientation and small scale of buildings fit the setting well; order in nature is glaring and a single large hotel would have overwhelmed the scene.

Although no signed Colter drawings or plans from Phantom Ranch exist, it is virtually certain that she designed the later additions to the ranch, including the small cabins, the recreation hall, the guide's quarters, and the shower house. She was employed full time as the designer/architect for the Santa Fe Railway during that period and the building designs bear her characteristic style. Colter was a meticulous designer who oversaw every detail of her developments (see Grattan 1980). It is doubtful that she would have tolerated another architect designing additions which might differ from her overall concept of Phantom Ranch.

Colter had established a precedent for inner canyon architecture that the US government would use as a guide for their own harmonious development. The high quality Phantom Ranch buildings embodied the principles of Rustic design, then being developed independently by the Park Service, and both are compatible. It is not surprising that the first government structure on Bright Angel delta (USGS residence #869) was modeled after the manager's cabin at the ranch.

The original USGS residence (1922) had full rock walls, with only the gable ends of wood, in a chevron pattern. Later structures like the Rock House and River Ranger Station have

rock masonry only in the foundations and corner piers, and wood comprised the remainder, much like the 1927 and 1928 two-bed Phantom Ranch guest cabins. The Rock House and River Ranger Station are early examples of Rustic architecture, but they do not have the same organic appearance as later Rustic structures. One reason is that the architects probably used standard plans not designed for their individual setting. Also, the masonry appears to be cosmetic, resulting in a less solid-looking building than later structures. Perhaps it cost more to quarry and build with locally available rock than it did to pack in other building materials by mule. Later CCC-built structures generally had solid rock walls, which might have been a function of low labor cost or a purer definition of Rustic. In the corridor, examples of these buildings are the trailside shelters and the Phantom Ranch mule barn. Non-extant buildings like the Indian Gardens mule barn and Bright Angel campground comfort station are other examples.

The Park Service designed some of these CCC-built structures for their individual settings, such as the 1935 Indian Gardens Trailside Shelter plan (Figure 33). Surrounding boulders became part of the plan, and locally quarried rocks used in the battered walls further blended it with the scene. The weathered railroad ties used for framing the shelters made them appear old. Rooflines were low, sometimes offset lest they look too regular, and covered with juniper bark to give a more natural look. Land contours occasionally became

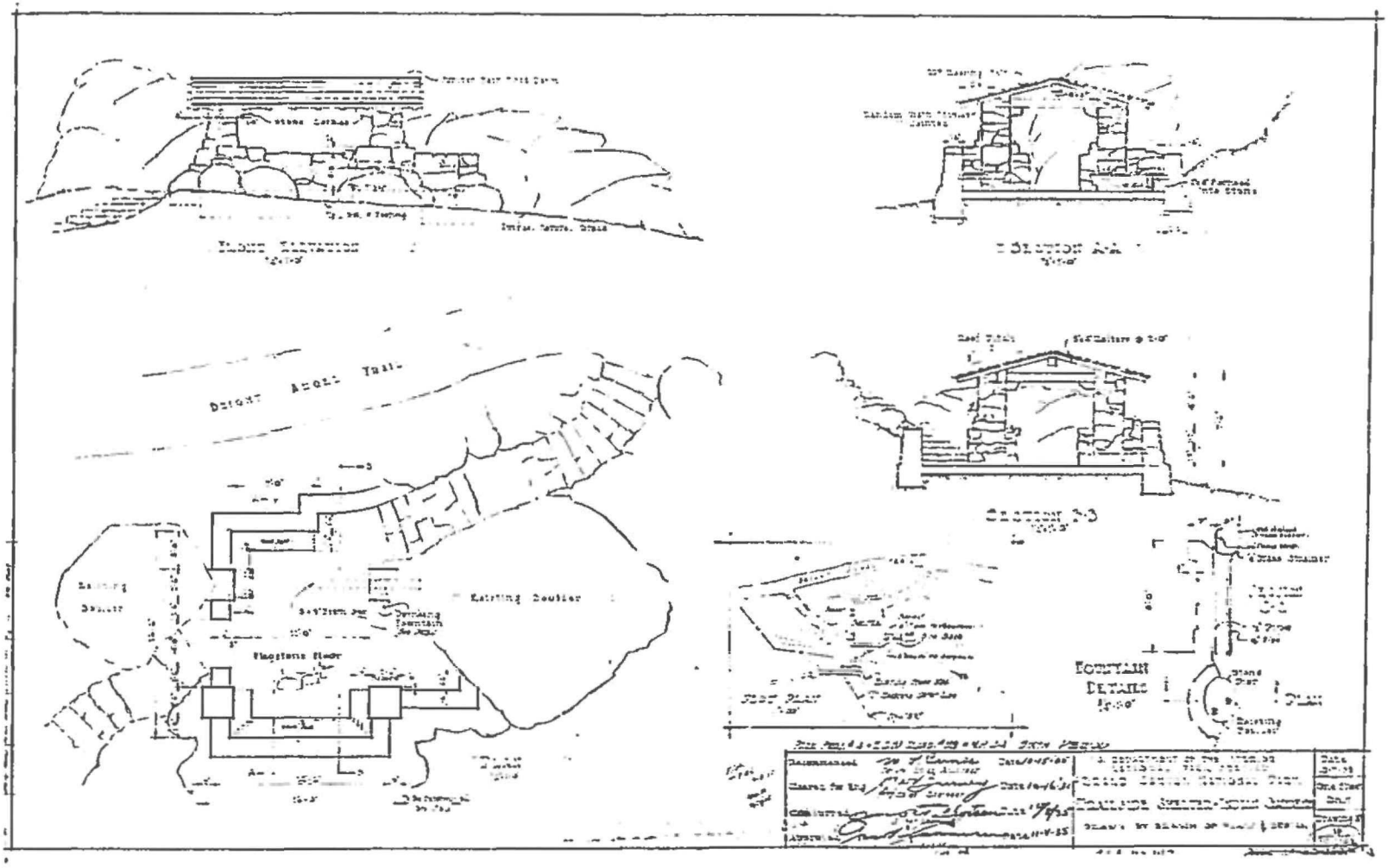


Figure 33

Indian Gardens Trailside Shelter Plan, 1935. Note the Surrounding Boulders. (Best Copy Available.)

part of the design; for example, at Phantom Ranch, the circular shelter/corral relates well to a natural concavity in the adjacent cliff face, and the roofline is stepped down as the land slopes.

The Rustic movement declined in the early 1940s for a number of reasons. The increased funding for Park development in the mid-1930s brought many new architects to the NPS Branch of Plans and Design. Trained in modern architectural ideals, they stressed simplicity in design and functionalism, rejecting the romanticism of Rustic. Perhaps as important, new building materials became available which reduced the enormous labor costs of building and maintaining Rustic buildings (Tweed, Soulliere, and Law 1977: 96, 97). Gone were rock walls, handcrafted hardware, and designs made for the setting. Park structures built after World War II tend to have simple, functional designs, little ornamentation or detailing, and few natural building materials.

Striking examples of this new design philosophy include the 1965 bunkhouse (#B473) and 1970 barn (#B470) at Indian Gardens. Although these buildings retained the board and batten wall material used in earlier structures, their designs are simple and without decorative detailing. Doors and windows are standard aluminum frame, bare metal poles support the barn shed, and rock foundations or walls are missing. The 1966 Phantom Ranger Station (#440) is also without detailing, and built entirely of modern materials, including asbestos siding. The 1960s additions to the Phantom Ranch Rock House (#154), River Ranger Station (#91), and

the Indian Gardens Ranger Station (#93) (Figure 34) are unsympathetic to the buildings' original design. Removal of original stone piers resulted in oddly scaled and unbalanced structures.

These examples illustrate the detriment that improperly designed additions and modifications can have on the character of a historic district. These functional structures are not necessarily poorly designed, they are simply incompatible with the existing architectural setting. It is not difficult to design new structures that are compatible with the old, but the designer/architect must be sensitive to those design features which give the historic district its overall architectural unity.

Figure 34

Indian Gardens Ranger Station, Facing South, 1985.
The Recent Addition is to the Right.

The district does contain examples of new structures which are compatible with their historic predecessors. The 1961 Bright Angel Campground Adirondack Shelter (#288) (Figure 35) is notable for its stone-slab construction, which harkens it back to the Rustic era. The 1981 Phantom Ranch Sewage Treatment Plant (#491), while contemporary in design, has detailing which respects Rustic ideals, such as board and batten siding, stone piers, and low pitched gable roof. It is not a strikingly innovative design, but it does blend well with the existing architectural forms in the district. The 1977 enclosure of the old electric generator housing into mule guide quarters (#868) is an example of sensitive modification. The materials and workmanship are high in quality,

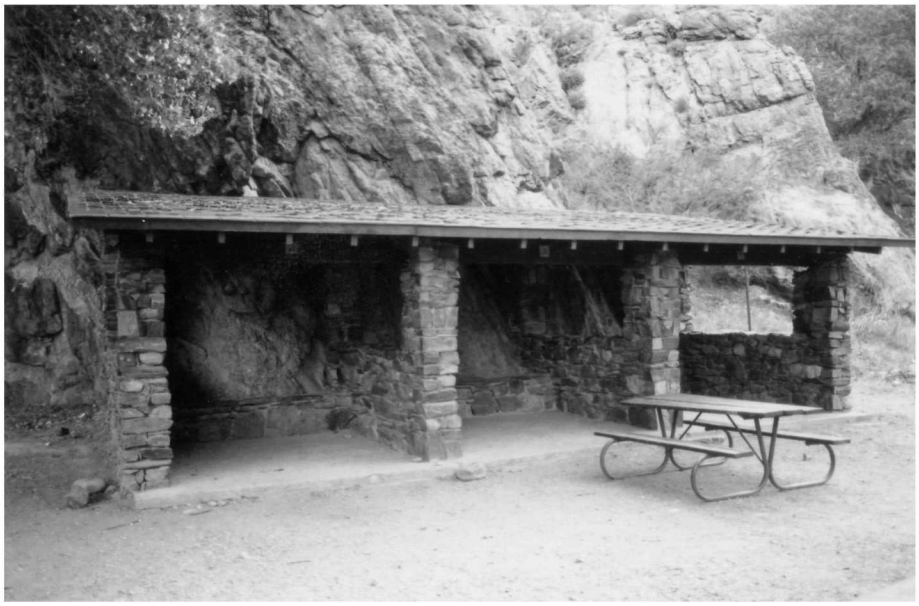


Figure 35

The Adirondack Shelter, Phantom Ranch, 1985

and similar to other structures at Phantom. It is virtually impossible to tell that this structure was recently enclosed.

One can design new structures and modify existing ones to successfully mingle with the old. Before that can be accomplished, the existing architectural character of the district must be evaluated. The following chapter is an analysis of architectural features which distinguish the historic structures of district, with suggestions on how they can be incorporated into new construction.

Chapter 4

DESIGN ANALYSIS AND CONSIDERATIONS FOR NEW CONSTRUCTION

Introduction

This design analysis applies to structures within the proposed district, but it has general applicability and could be used for any other group of structures. Table 1 presents the design features which together define the original architectural character of the district.

Table 1

Design Features Used in the Analysis

1). Building Height
2). Building Size
3). Proportions
4). Massing
5). Orientation and Site Utilization
6). Directional Expression
7). Facade Rhythm
8). Door Type
9). Window Type
10). Roof Form
11). Building Materials
12). Color
13). Texture
14). Detailing
15). Landscaping

These design features collectively convey the architectural style employed in the Cross Canyon Corridor development areas. If the district's historical character is to be maintained, these features should be considered when preparing designs for new construction or modification of existing facilities.

The summary of architectural features is based on building appearance during the period of historical significance. Most inner canyon development occurred in the 15 year period which began in 1922 with Phantom Ranch construction and ended in 1937 when the CCC built their last structure. An exception is the Indian Gardens rock residence (#18), which Santa Fe Railway rebuilt in 1943 following a fire. Another 20 years passed before any new construction occurred in the trail corridor. The district's architectural character is derived from the Rustic period lasting from 1922 to 1943, and this time frame will be used as a reference for future development.

In some categories like color, doors, and windows, original features are no longer present. However, original plans, historic photographs, and paint scraping reveals how these missing characteristics initially appeared. For the purpose of this analysis, the 1928 Phantom Ranch dining hall addition and the circa 1925 USGS residence sleeping porch addition are considered significant because they are compatible historic additions. Additions made in the 1960s to the Phantom Ranch Rock House, River Ranger Station, and Indian Gardens Ranger Station are not compatible with the historic

pattern and so are not considered in the discussion. Critical architectural features are defined below, followed by illustrations of examples.

Architectural Features

1). Building Height: All buildings are single story, with eaves about eight feet above grade.

2). Building Size: Size varies with use, but all buildings are generally small. The trailside shelters are smallest, averaging some 200 square feet. Residential structures, including the Phantom Ranch guest cabins, range in size from about 200 to 350 square feet. The largest structures, those intended for services (like the pump stations, barns, and sewage treatment plant) or communal use (like the dining hall and bunkhouses) measure between 1,000 and 2,000 square feet.

3). Proportions: Since all sides of buildings in the district are usually visible, the proportion of front to side wall is most obvious. Most structures are slightly rectangular, with proportions ranging from 1:1.2 to 1:1.25. Others are more rectangular, clustering around 1:1.75. Another important proportion is that of roof height to wall height. Measurements taken from the roof ridge to the bottom of the gable (eaves) and from there to the exterior grade (base of wall) indicate that the most common proportion of roof to wall height is 1:2, with a range of 1:1.1 to 1:2.8.

4). Massing: This refers to the overall shape of buildings. In the district, most structures are simple rectangular forms on the ground floor, capped with a single, usually symmetrical, roof configuration.

5). Orientation and Site Utilization: The Phantom Ranch area is composed of three clearly articulated, well-balanced building clusters. From north to south, the first cluster is the Phantom Ranch concession. The buildings form an inward-facing oval focusing on the North Kaibab Trail, central lawn, and former swimming pool. Individual building orientation varies to avoid a too-uniform appearance, and buildings are spaced from about five feet to forty feet apart, with smaller ones closest together. Two large buildings, the employee bunkhouse and dining hall, enclose each end. A second cluster is farther south, where service buildings like the guide's quarters and Harvey mule barn are located in a separate unit. Structures abut the steep canyon walls on the east side and a long low rock fence once enclosed the area from the guide's quarters to corral on the west along the North Kaibab Trail, unifying the structures. The third cluster is on the delta, where the US government structures are located. They are set at the base of the steep canyon wall, facing out toward the creek and river. The USGS buildings, set in the open on the delta, also face the creek.

The layout at Indian Gardens contrasts that of Phantom Ranch. There are building clusters here, but they are not well-balanced as at Phantom Ranch. The Bright Angel Trail divides just before entering Indian Gardens from the south, and splits again within the campground, resulting in a diffuse network within and around which facilities are casually situated. From the south, the first building encountered is the modern obtrusive barn/corral, clearly visible to the west of the trail. Next, the two adjacent residential cabins are aligned with each other and overlook the campground. Recent additions, like the bunkhouse and ranger quarters addition, have intruded on the space around the rock cabin, crowding it in. On the west side of the campground, unattractive service buildings of recent date detract from the natural scene. The trailside shelter is located to the east of the campground, between it and the Bright Angel Trail, and is so inconspicuous as to be unnoticed. At the far north end of the complex, the pumping stations are covered with vines to conceal them, and thus have little visual impact; however, the sound of their motors is audibly intrusive. The overall impression of Indian Gardens today is one of informality with residential and service structures crowded together at the south end, the maze of campground and more service structures in the center, and noisy pumphouse facilities at the north end.

6). Directional Expression: The low pitched roofs with shed extensions, single story height, and battered stone walls and foundations tend to give the buildings a horizontal expression.

7). Rhythm: Rhythm refers to the regular recurrence of related elements. In buildings, rhythm is most often expressed in the pattern created by alternating solids (wall space) and voids (door and window openings). Structures in the district have a symmetrical rhythm, for example, a dominant pattern is window-door-window, or a bank of symmetrical window openings; the rock piers which are symmetrically placed at the four corners of structures form another dominant pattern.

8). Door Type: Few original doors are still in use, but there was once a great variety in door treatment. The 1922 Colter cabins had Dutch doors with exposed framing (most exist today), while the later guest cabins had single hinged doors with a large pane of glass in the top, and screen doors. Other Phantom Ranch buildings often had solid core wood plank doors with hand crafted hinges. The NPS structures most often had solid core wood plank doors, usually with exterior exposed diagonal framing.

9). Window Type: Many original windows have also been replaced, but their appearance is generally known. NPS residential structures usually had square four-light awning windows. At Phantom Ranch, rectangular casement windows predominated. The configurations of casement

lights varied, with six-, eight-, and nine-lights in sets of two and three lights across most common. Double-hung sash windows were also used. Windows typically displayed a great deal of texture through the use of multiple lights in various patterns.

10). Roof Form: Every building in the district has a relatively low-pitched gable roof with overhanging eaves. Variety is achieved by offsetting the ridge, stepping down successive gable roofs, and by adding shed extensions onto the roof plane.

11). Building materials: The unifying material for the district is rock, which is typically seen in foundations and corner piers, but sometimes comprises the entire exterior wall. Rock treatment varies in both material and shape. Because local rock was used in construction, the type found in structures reflects the surrounding geological stratum (for example, sandstone is used in Three-Mile Rest House, and schist is used in the River Rest House). Rock shape varies from roughly hewn stone to rounded river cobbles. Rock walls are usually battered, sloping inward from bottom to top. Correspondingly, rock size decreases from foundation to roof.

Board-and-batten wood siding is usually used for walls, and some buildings are entirely composed of it. NPS residential structures are typically built of plank board with exposed diagonal framing and stone piers. Roofs are most often covered with tan, brown, or light

green composition or asphalt shingle, but the trailside shelters originally had coverings of shredded juniper bark.

12). Color: Because the Rustic style stressed harmony with nature, structural wood was stained brown, or (as in the case of masonry) left a natural color. The 1922 buildings at Phantom Ranch, however, displayed Mary Jane Colter's flamboyant use of color. Doors and windows provided an interesting contrast to the otherwise naturalistic treatment. Dark blue, deep yellow, and dark green were most often used in alternating patterns: for example, the door to Cabin 9 had a dark blue base with yellow cross framing, while that of Cabin 8 had a dark green base with yellow cross framing. Door and window jambs and frames received similar treatment. Because original doors and windows have been removed from the later cabins, it is not known what colors they once were. The dining hall trim was originally painted a robin's egg blue.

13). Texture: The buildings in the historic corridor are rich in texture, achieved primarily through the use of rusticated stone, board-and-batten walls, and variety in window treatment. The masses of battered masonry piers and walls with deep joints creates an illusion of structures which have apparently risen from the ground.

14). Details: Ornamental detailing is simple and largely based on structural features. Rafter ends under deeply overhanging eaves are exposed and often paired; timber

braces and brackets (occasionally resting on rock projections) are oversized, and doors are hand crafted. Gable ends sometimes display battens in a horizontal or chevron pattern, highlighted by contrasting paint. Colter added decorative touches like old lanterns hanging from braces and colorful awnings.

15). Landscaping: Since district structures are supposed to blend with the natural scene, landscaping is generally limited to the planting of cottonwood trees and pruning of native vegetation. Historical photographs indicate that foliage around buildings was kept well-trimmed, providing views of the entire structure. The Park Service discourages introduction of non-native plants into the canyon, but the fruit trees still seen at Indian Gardens and Phantom Ranch are an exception.

Recommendations

The above analysis describes architectural features which combined give the district an overall design unity. Figures 36, 37, 38, and 39 illustrate many of the features. Because the historic architecture of the inner canyon is so unified, design innovation in new construction is less feasible than in a district comprised of many different building types and styles. However, this problem is somewhat offset by the fact that buildings and structures are generally well-spaced and interspersed with greenery and other natural features, blurring discrepancies between individual shapes and styles.

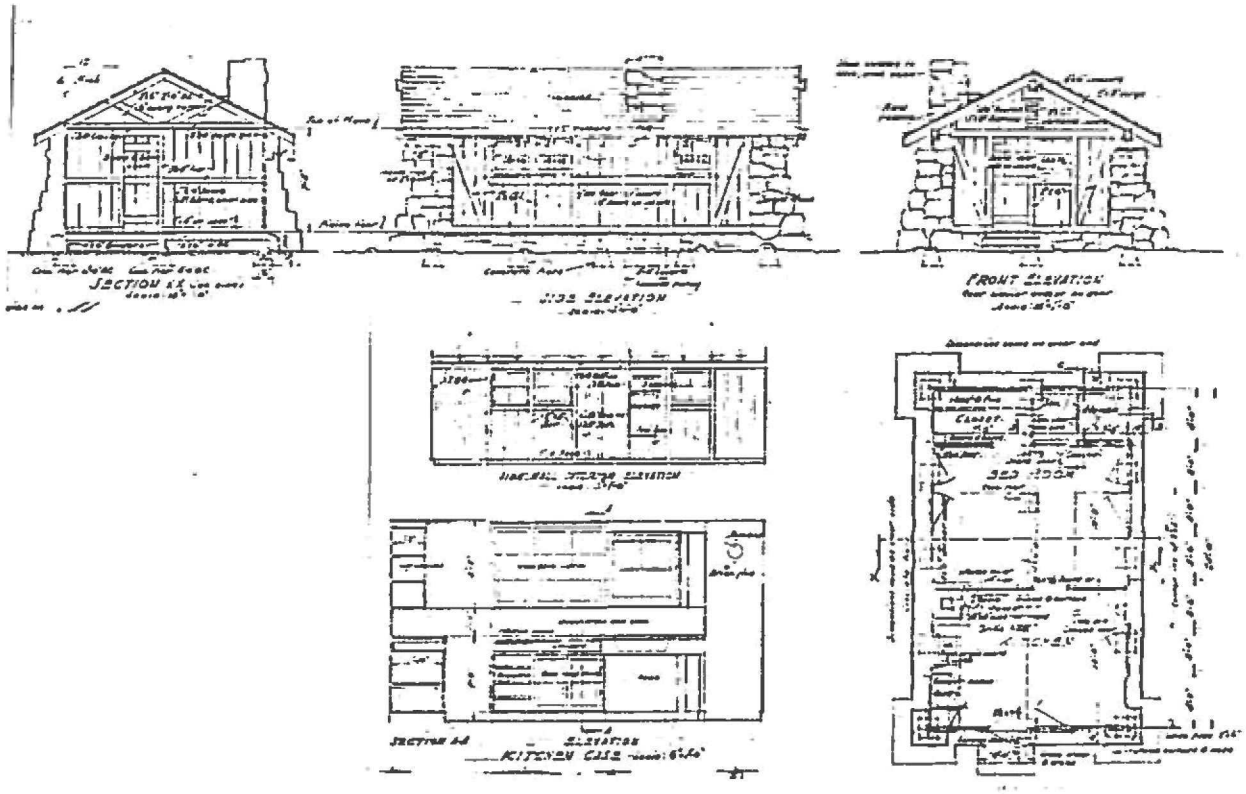
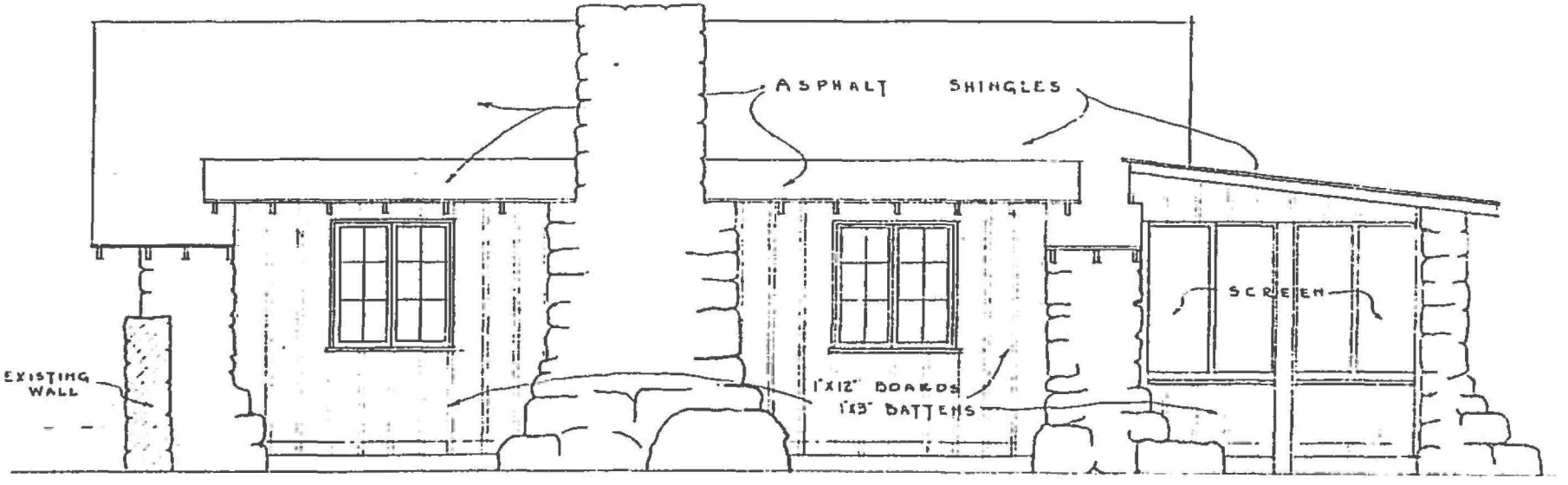


Figure 36

This 1932 Plan for the Indian Gardens Ranger Station (#93) Illustrates Features Typical of NPS Rustic Style Structures: Battered Rock Foundations and Corner Piers, Vertical Board, With Exposed Framing for Doors and Walls, Low-Pitched Gable Roof, and Four-Light Awning Windows.
(Best Available Copy.)



WEST ELEVATION

Figure 37

This 1930 Drawing of the West Elevation of the Trailcrew Bunkhouse (#875) at Phantom Ranch Illustrates the Following Design Elements: Six-Light Casement Windows, Gable Roof with Shed Extensions on Both the Roof Plane and Gable End, Board-and-Batten Walls, and Battered Rock Piers and Chimney. (Best Available Copy.)

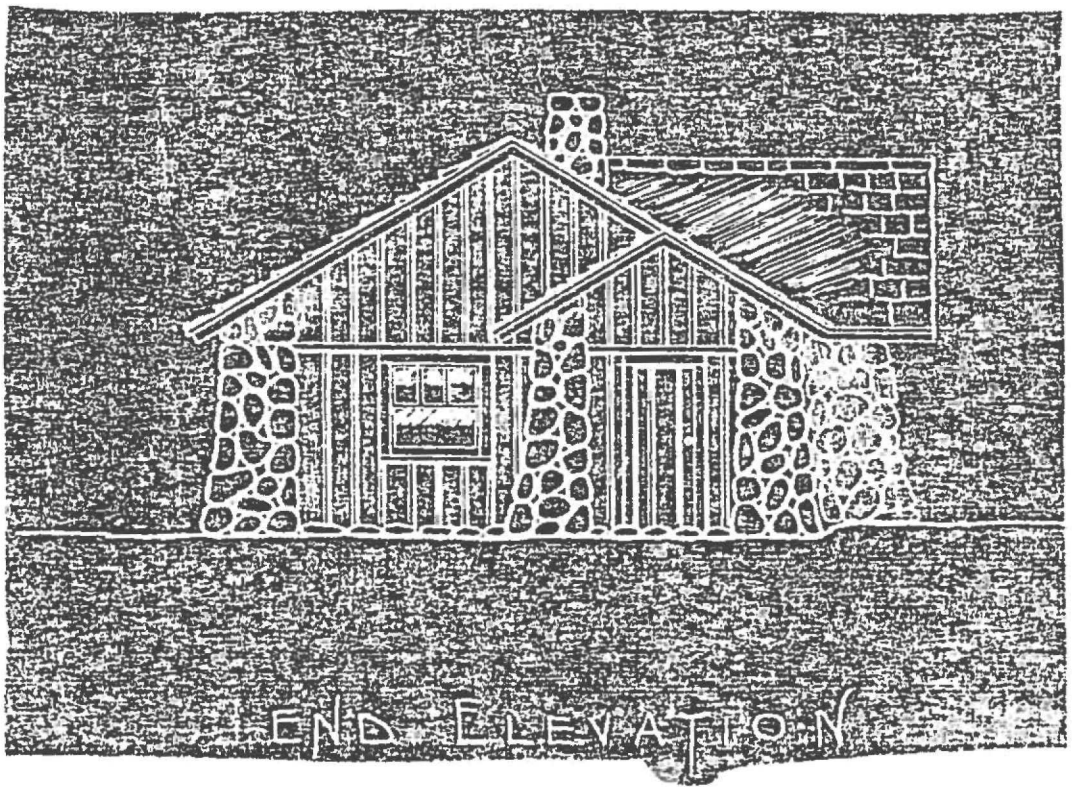


Figure 38

This 1929 Drawing of the Phantom Ranch Showerhouse Shows More Typical Architectural Features in the District: Double-Hung Sash Windows, Rock Corner Piers, and Board-and-Batten Walls. These Walls Were Filled in With Rock During Ca. 1947 Remodeling

Figure 39

This Recent Photograph of Guest Cabin #9 Shows the Original Handcrafted Dutch Door, Decoratively Carved Rafter Ends, and Double Purlins.

In the district, some of the architectural features are more critical to design compatibility than others. Scale, materials, texture, color, roof shape, window type, and architectural details are most important. Specific recommendations regarding each of these features follow.

Scale: Maintain the existing scale and proportions in the district. Building size should be kept as small as feasible for the proposed use. At Phantom Ranch, new additions should not be built in the main concession area (the oval enclosed by the dining hall and employee bunkhouse), as the existing balance would be upset. Additions might be placed farther south, near the

Phantom Ranger Station. Distances between buildings should remain proportionate to existing space, with care taken not to 'crowd' buildings. New construction might be screened by vegetation to blend it with the natural scene.

Materials: New structures must utilize rock and wood in construction. Design flexibility can be achieved by varying the type of rock used (rounded river cobbles versus quarried rock), and proportions of rock to wood (rock foundations, corner piers, or solid rock walls). If major repairs necessitate wood replacement, the same type of wood should be used. For example, the trailside shelters are built with railroad ties, and the original 1922 Phantom Ranch cabins have Redwood framing. Roofs should be covered with asphalt or composition shingles, not wooden shakes, which were never used in the district. Be sure that any changes are historically accurate.

Texture: Perhaps more than anything else, texture conveys the rough-hewn Craftsman philosophy of design, and is an important aspect of district architecture. It can be imparted on wooden walls by building with board-and-batten siding or plank board with exposed diagonal frame siding. Chevron designs can add texture to wooden gable ends.

The rock masonry in buildings is highly textured and natural in appearance. Quarried rock should be roughly

shaped, and river cobbles and boulders unmodified. Walls and piers are battered, wider at the base than at the top. The best examples of masonry are found in the older Colter buildings, where huge boulders form foundations and rock size decreases from the bottom to the top. The masons put interesting and sometimes playful elements in the walls, such as the "baseball mitt" on the east side of the dining hall (Figure 40) and the metate which flanks the south entrance (legislation protects the unauthorized removal of artifacts from federal and state lands today). Colors and textures

Figure 40

Wooden "Baseball Mitt" in the Wall of the Dining Hall

should vary; limestone set next to schist provides an interesting and appealing contrast. To keep the walls as natural in appearance as possible, mortar in joints should be deeply raked and unobtrusive.

Color: Colors in the district are natural, with masonry left unpainted and wood either stained or painted brown. The color of mortar used in repointing should be consistent with that of the existing mortar.

The green trim currently used at Phantom Ranch is not historically accurate, and the Fred Harvey Company may wish to consider matching the historic colors as repainting becomes necessary. Original colors can be determined by scraping paint where original features exist. Where original features do not exist, as in the window and door trim on the 1927 and 1928 guest cabins, colors which are complimentary to known historical colors on the rafter ends and purlins might be chosen. Colter chose bright, vibrant, and often contrasting color schemes for the cabins, and they would be interesting to reproduce. The Fred Harvey Company recently repainted the Bright Angel cabins on the South Rim with the original Colter color scheme, and while the result was controversial, it nevertheless accurately portrayed the designer's original intent.

Roof Shape: Since all roofs in the district are low-pitched gable, this style should be maintained for new structures. Some variety may be possible by offsetting the gable ridge slightly to one side, as at Three-Mile

Resthouse, and by adding small shed extensions onto the roof plane.

Window Type: Most original windows have been removed from buildings in the district, resulting in a great loss of integrity. The modern aluminum frame window replacements are inappropriate and rid the buildings of much of their historical character. As replacements become necessary, efforts should be made to install historically accurate windows. At Phantom Ranch, these were usually multiple light casement windows or double-hung sash windows with wooden mullions and muntins. NPS structures usually had four-light awning windows.

Architectural Details: The use of a few simple architectural details will enhance the design of new buildings. Rafter ends should be exposed and paired, with simply carved butt ends. Knee braces and brackets which rest on rock projections are another dominant feature. Purlin ends might be carved in diamond patterns as well.

Interiors

This analysis has focused on exterior architectural design, but interior design is also important to consider. Most structures have received interior "modernizing" modifications, particularly the Park Service residential structures. The trailcrew bunkhouse has changed drastically from its original interior appearance. The Phantom Ranch guest cabins suffered a loss of character when multiple sets of bunkbeds were crowded into cabins which historically held

only two single beds. The fireplaces were sealed, the cement floors covered with linoleum, and southwestern ornaments removed from the walls. Fortunately, original walls and ceilings remain intact. While it would be desirable to return the cabins to their original interior appearance, it may not be economically feasible. Both the Park Service and the Fred Harvey Company should consider rehabilitating the interiors of their buildings in the future. Information on historical appearance of interiors is scant, but some clues exist.

Guidelines

A list of general guidelines to remember during maintenance, rehabilitation, and new construction activities follows. The guidelines are derived primarily from Stahl (1984) and the US Department of the Interior (1983).

1). Consider rearranging non-character-defining interior spaces to accommodate new uses before making additions to buildings. For example, an interior partition may accommodate a restroom, rather than adding one on to the exterior.

2). When exterior additions are necessary, they should be made to the rear or least visible elevation of the building and compliment the original design in size, scale, and materials.

3). Preserve existing historic fabric whenever possible, and ensure that new additions cannot be confused with it.

4). Remove additions that are incompatible with historically significant characteristics when possible.

5). Always consider compatibility and historical accuracy when designing modifications or new construction.

6). Choose quality materials and execute quality workmanship in maintenance, modifications, and new construction.

Summary

There is no formula for designing new structures which successfully, yet distinctively, mingle with the old; that is the domain of the individual creative designer or architect. In the words of one architect: "Slavish reproduction of the past will deprive us of the landmarks of the future" (Conron 1980: 138). The preceding analysis should be consulted for a general idea of existing design components in the district, but individual building(s) to be affected by new work should be studied in depth, with designs created for each particular structure.

Available Resources

Many original design plans and historical photographs for the structures discussed here exist in various locales. Along with historical maps and documents, they provide enormously helpful information regarding their original appearance. The NPS historical architect has a collection of such documentation which I gathered specifically for this project, and information on individual structures may be available in more detail than is possible to present in this report. The Grand Canyon Study Collection is an excellent

source of information, and the Fred Harvey Maintenance Department has some original plans, as does the NPS engineer's office. The Western Regional Office in San Francisco also has many original plans on microfiche. Interested individuals should first inquire at the historical architect's office, since information collected from all of the above sources is available there.

The growing national interest in historic preservation has given rise to an industry which specializes in supplying hardware for historic buildings, including: doors, windows, fixtures, fabrics, furniture; nearly everything needed to complete any project. Technical information on restoration, renovation, and rehabilitation of historic structures is available from many sources. Interested individuals might consider the following materials as points of departure.

Design Compatibility

For information on designing new structures which are compatible with old, the National Trust for Historic Preservation (1980) has published a collection of articles by various experts exploring the issue. The US Department of the Interior (1983) has set standards for certified rehabilitation of historic structures, and published explicit guidelines for carrying them out.

Restoration Hardware: Commercial Sources

For current information on hardware sources, journals are most helpful. Historic Preservation and The Old-House

Journal both carry advertisements on a variety of restoration services and products, and the latter journal has 'how-to' articles concerning specific restoration projects. Back issues are available. The Old-House Journal Catalog, updated yearly, is the most comprehensive and reliable source for restoration services and products.

General Interest/Bibliography

The Preservation Press published the quintessential volume on preservation called All About Old Buildings: the Whole Preservation Catalog (Maddex, 1985). It contains information and bibliographical sources on many aspects of the field.

The State Historic Preservation Office, which serves as a liaison between the National Park Service and local preservationists, can provide additional information and assistance.

In the next chapter, a related topic is discussed: cyclic maintenance for historic structures in the district.

Chapter 5

CYCLIC MAINTENANCE FOR HISTORIC STRUCTURES

Introduction

An important step toward preservation of significant historic structures is timely and adequate maintenance. The NPS historical architect for Grand Canyon, Billy Garrett, and I conducted an inspection tour of the district between November 6 and 8, 1985, in order to identify maintenance needs for historical structures.

Because of time constraints, it was not possible to inspect all of the significant historical structures in the district. Those which did receive inspection include: the four trailside shelters (#s 141, 142, 143, 179), the Indian Gardens Ranger Station (#93) and rock residence (#18), the Phantom Ranch dining hall (#892) and guest cabin #10 (#889). All of the other structures which contribute to the significance of the district should also be inspected in the future, including: the Indian Gardens pumphouses (#20, #31), and reservoir (#32); the Phantom Ranch guest cabins (#s 880, 881, 882, 884, 885, 886, 887, 888, 890, and 891), the wrangler cabin (#868), the manager's cabin (#883), the bathhouse (#879), the employee bunkhouse (#878), the NPS trailcrew bunkhouse (#875), River Ranger Station (#91), Rock House (#154), STP operator residence (#869), and mule barn (#222).

Inspection Technique

As a result of our inspection tour, we devised a maintenance inspection form, and example of which is provided in Figure 41 and Tables 2 and 3. This form is based on building features and is therefore extremely adaptable to different building and structure types. Before inspecting a structure, it is helpful to draw a reference plan view to serve as a key for comments. Then one simply describes and evaluates the structure feature by feature from the top to the bottom and from the east facade around the structure in a counterclockwise direction. It is suggested that inspections be conducted by properly trained individuals. All building inspection forms for those structures inspected can be found in the NPS historical architect's office.

A Summary of Findings

The historical structures in the district are generally in good condition. The most common problems occur in the roofs; many suffer from insufficient maintenance. Past maintenance crews often simply nailed new shingles over the old as needed. Unfortunately, the thick layers of shingles absorb water, which contributes to wood rot and weighs the roof down unnecessarily. The old shingles should be stripped before adding new ones. The Fred Harvey Company is currently reroofing several structures at Phantom Ranch which had badly needed replacement. Several National Park Service structures, like the mule barn, need new roofs. The trailside shelters need minor repairs and replacement of shingles.

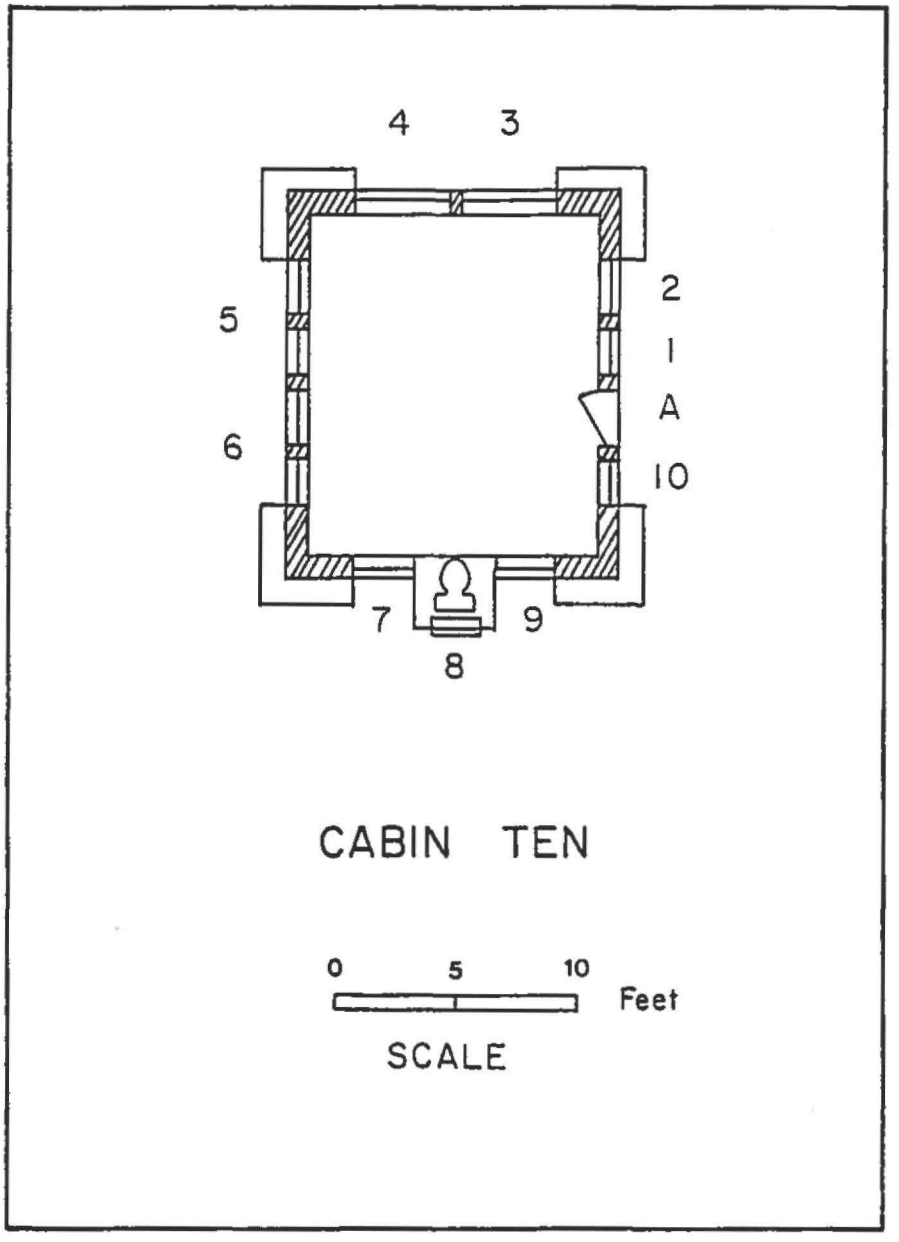


Figure 41

Plan View of Phantom Ranch Guest Cabin #10. Reference Numbers are Used in Tables 2 and 3.

Table 2

Maintenance Inspection Form for Cabin 10. The Reference Numbers are Keyed to Figure 41

REFERENCE #	TYPE	CONDITION	NOTES
Door A	Flush, solid core	Bottom veneer separated, threshold loose, striker plate loose, mismatched numbers on front.	
Windows 1 and 2	Aluminum frame, 2 light.	Screen missing.	Original pair missing.
3	Aluminum frame, 2 light.	External screen	Original pair missing.
4	"	"	"
5	"	"	"
6	"	Filled with plywood & evaporative cooler. Some damage to sill.	"
7	Aluminum 1/1 fixed.	Frame bent.	Original missing.
8	One light hopper.	Sash joints separating, bad putty job.	May be original.
9	Aluminum 1/1 fixed.	Poor caulking on sash.	Original missing.

Table 3

Maintenance Inspection Form for Cabin 10,
Keyed to Building Features

FEATURE	DESCRIPTION	CONDITION
Roof	Simple gable with intersecting shed at entry and shed in gable above WC and alcove.	Sound, some warping.
Roofing	Asphalt shingle.	Generally good on S, some loose, over 1"+ thick with old shingles; poor on N side, very poor over WC.
Sheathing	1" x 6" board.	Some cracking and splitting, rear shed splitting and warped; front of front shed warped and cracked.
Rafters	2" x 4", ends cut perpendicular to ground.	Ends weathered; rafters at each end of rear shed are badly cracked.
Verge	3" x 6", ends cut perpendicular to ground.	Ends weathered.
Perlin	4" x 4", end cut in diamond pattern.	Ends weathering.
Walls	Stone corner piers, rubble masonry with river cobble and/or shaped stone; walls are battered.	Good.
	12" board, 3" batten.	Vertical cracks patched with strips of 30# roll roofing; several loose battens; hole open around pipe for sink.

Some of the masonry in structures needs repointing, particularly the trailside shelters, which also have loose rocks in walls and floors. Masons ought to repoint carefully, and attempt to match the original mortar in color and type. They should deeply rake the mortar so that it is noticeable. Portland cement is an undesirable material for repointing because it is inflexible and can actually contribute to the deterioration of walls. Lime mortar, which allows transpiration of moisture, is a preferred alternative (Department of the Army 1977: 2-3).

Native vegetation growing immediately around structures needs to be trimmed back because it contributes to wood rot and can break masonry apart. From an aesthetic viewpoint, the vegetation obscures primary facades. Also for aesthetic reasons, it is recommended that refuse around structures be cleaned up and removed. Although refuse is generally not a problem, two trouble areas at Phantom Ranch are the east side of the trailcrew bunkhouse (where discarded water heaters lie), and behind the Fred Harvey maintenance shed.

Rafter ends, braces, brackets, and purlins which are exposed to the weather tend to suffer from rot. Damage is generally minimal, and can be repaired rather than replaced. The NPS mule barn displays an example of improper maintenance. Several rotting log rafter ends were simply sawed off rather than repaired. Repair often involves removing the damaged end and splicing on a new one which is shaped to match the original piece. Replacement timbers and log ends

should be seasoned and match the original as close as possible in species, grain, and texture. Preservatives might be considered for exterior wood to keep damage from moisture minimal (Department of the Army 1977: 3-4).

Windows often show cracked or improper caulking around glass panes, and have missing or bent screens. Doors commonly have loose hardware and striker plates.

Recommendations

None of the maintenance problems are critical at this point, but the Park should initiate a cyclic building inspection and maintenance program before major problems arise. This might be coordinated between the NPS maintenance division and the historical architect. The Fred Harvey Company already has a maintenance program for the structures at Phantom Ranch, but it is recommended that they consult with the historical architect when delicate repairs to significant structures is contemplated, to ensure that repairs are done properly.

Maintenance is typically carried out on an "as needed" basis. The cyclic maintenance program would formalize the procedure, so that structures are not overlooked until a problem becomes overwhelmingly evident. Maintenance forms on each structure should be filed and updated periodically, depending on building need and budgetary considerations. Short and long term budgetary planning must be established so that significant structures receive proper care. Once the proposed historic district is listed on the National

Register, the Fred Harvey Company may take advantage of tax credits for certified rehabilitation of their significant inner canyon structures.

General Guidelines for Maintenance

The following guidelines for maintenance of historic structures were derived from the following sources: Stahl (1984), Department of the Army (1977) and US Department of the Interior (1983).

1). Repair small problems before they become major. Neglect may necessitate drastic repair measures which could affect a significant structure's integrity.

2). Retain original fabric whenever possible. It is always better to repair rather than replace original elements.

3). Avoid using modern materials, particularly those which are incompatible with the original. If necessary, try to locatereproductions through specialty houses.

4). Document all repair work with notes of treatment used and photographs, both before and after the work is completed.

5). Be sure that you are correcting the problem and not just a symptom. For example, cracked masonry may indicate a sagging foundation.

6). Inspect for related problems. If a roof is leaking, look for internal damage.

7). If the resources are not available to solve a problem in the long-term, consider using acceptable temporary measures.

8). Question whether the action is really necessary. For example, in some instances cleaning historic fabric may damage more than it helps.

9). Always choose correction measures which are simplest and have the lowest impact on historic fabric.

10). Research several repair techniques before choosing which is best for the particular problem. Avoid quick "band-aid" measures which can harm resources.

References for Historic Structure Maintenance

Maintenance of historic structures is a highly technical field. It is impossible to adequately summarize all of the materials and techniques which specialists have developed for the proper maintenance and repair of historic fabric. As with architectural rehabilitation, there are a growing number of resources available on the subject. It is recommended that anyone who carries out maintenance on historic structures either have experience in the field or work under the direction of an experienced person. Outside help may be available through training sessions offered by the Park Service or other agencies, or through workshops offered by the private sector. The NPS historical architect should be consulted if difficult maintenance problems arise.

Two reference guides which also contain bibliographies for additional information are recommended; there are also others. Stahl (1984) is an excellent comprehensive guide to all aspects of the subject. The Department of the Army (1977) has published a small but helpful manual which has a

good bibliography. It can be ordered from the US Army Publications Center, 1655 Woodson Road, St. Louis, MO 63114.

The Old House Journal has articles on preservation and maintenance projects. A cumulative index and back issues may be ordered from the Old-House Journal Corporation at 69A Seventh Avenue, Brooklyn, New York, 11217.

The National Park Service publishes a wealth of technical bulletins dealing with specific maintenance and repair problems. One of the best guides is the US Department of Interior (1983) publication which sets standards for certified rehabilitation of historic structures. The Preservation Assistance Division, National Park Service, Department of the Interior, Washington, D.C. 20240, should be contacted for further information.

Significant historic structures are worthy of preservation through cyclic maintenance. In the next chapter, the overall significance of the district and of individual structures is evaluated in terms of National Register criteria.

Chapter 6

NATIONAL REGISTER EVALUATION OF THE PROPOSED CROSS CANYON CORRIDOR HISTORIC DISTRICT

National Register Criteria

Before individual properties within the district can be assessed, it is important to understand some of the terms used in the study. The following discussion is based on information provided by the National Park Service (1982). The National Register of Historic Places is a list of properties which are significant in American history, architecture, archaeology, engineering, and culture, and which are worthy of preservation. The Register is maintained on behalf of the Secretary of the Interior by the National Park Service, which developed the following criteria to guide anyone who is assessing the significance of potential National Register properties:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> A. that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> B. that are associated with the lives of persons significant in our past; or

C. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. that have yielded, or may be likely to yield, information important in prehistory or history (National Park Service 1982: 1)

A National Register Historic District is a geographically definable area that possesses a significant concentration, linkage, or continuity of buildings, structures, or sites united by past events or by physical development. The district as a whole must represent one or more significant themes or patterns in the architecture, history, archaeology, culture, or engineering of the locality, state, or nation. Furthermore, the district must have characteristics that make it a good representative of that theme or pattern, in other words, it must possess integrity. Within the district, individual structures are assessed for historical significance (in the context of identified themes), and integrity. If a structure contains both, then it is considered to be a contributor to the district; if it is lacking in either category, then it is a noncontributor.

Historic Districts

Districts convey a sense of time and place through the survival of many different kinds of features; in this case, trails, bridges, buildings, etc. It is often true that the district as a whole is greater than the sum of its parts. That is, while structures may lack individual distinction, it is their contribution to the the district that is

significant. A district may contain structures which do not contribute to the significance of the district, such as non-historic development, historic entities which have lost integrity, or historic entities which are not associated with the themes for which the district has significance.

Context and Themes

The key to determining the historic significance of districts or individual properties rests on context. Resources are best evaluated when broad patterns of development within a particular theme are known, so that comparisons with similar properties can be made. Historical context is derived by gathering information on all properties which relate to a particular historic theme and its geographically and temporally defined limits. For example, a major theme for the Cross Canyon Corridor Historic District is tourism on a national level between the years 1901-1943. In order to decide whether the district is a good representative of that theme, it should be compared with other tourist-related properties like National Parks, major trail systems, or tourist resorts which were developed at the same general time. Information is available from secondary sources to evaluate the district within that context.

Another potential theme for the district is in the realm of engineering. The water pipeline facilities at Indian Gardens, the Kaibab Suspension Bridge, the telephone line, and the USGS Colorado River gauging station would all be likely candidates for National Register inclusion under this

theme. Unfortunately, the engineering merits of these properties cannot be evaluated at this time because to do so would require a technical study by a qualified engineering expert to compile contextual information. Creation of another historic district based on the theme of engineering may someday be warranted. Mountain Bell recently nominated the Trans-Canyon Telephone Line to the National Register as a structure.

It should perhaps be pointed out here that an individual property may be significant under more than one theme, for example, tourism and architecture. National Register Historic Districts may overlap one another as well. If a property within the corridor has been excluded from this nomination, it may still be eligible for inclusion on the National Register as part of another district nomination. It simply may not fall within any of of the themes defined for this particular district, or it may be geographically separate from the district boundaries. A discussion of the historical themes defined for the district follows.

Historical Context and Periods of Significance

The developmental history and architectural evolution sections summarize the influences that shaped physical development within the trail corridor. From the summary, I derived the following themes; they provide the basis to evaluate the district as a whole, as well as individual properties within the district.

Buildings and structures in the Cross Canyon Corridor Historic District are significant primarily within the realms of tourism, architecture, transportation, and politics/government under criterion A ("associated with events that have made a significant contribution to the broad patterns of our history") and criterion B ("embody the distinctive characteristics of a type, period, or method of construction . . . or that represent a significant and distinguishable entity whose components may lack individual distinction").

The historic period of significance begins in 1891 with the initial construction of the Bright Angel Trail and ends in 1943, when the historical period of development ended and a 20 year construction hiatus began following reconstruction of the Indian Gardens rock residence (#18). Although some of the thematic periods (such as tourism) extend to the present, the ending date for historic association is 1943. The National Register normally excludes properties less than 50 years old, but there are some exceptions. Properties which are integral parts of districts that do meet the criteria are eligible when sufficient historical perspective exists to determine that the property is exceptionally important and will continue to retain that distinction in the future. Most of the structures within the district which are less than 50 years old qualify as contributors under this criterion. Given this exception to the 50 year rule, many of the historic themes extend up to 1943.

For each theme, a judgement is made regarding its level of significance. Associated structures in the district are considered to be significant at the local and national level.

Tourism: Period of Significance, 1891-1943

Perhaps the most important aspect of the Bright Angel Trail, its connecting corridor trails, and the structures associated with them, is that they collectively provided human access to and support facilities within one of the greatest natural wonders on the globe. Today the trail is one of the most popular and famous trails in the world, traveled by over 150,000 hikers each year. Another 2.5 million gaze down at the trail from the rim. Many others come to take the famous mule ride to Plateau Point (near Indian Gardens) or to Phantom Ranch, a Grand Canyon tradition for over 80 years. Both Indian Gardens and Phantom Ranch developed almost exclusively in response to tourist demand and need for governmental regulation of canyon resource use.

There are numerous trailside attractions for visitors to enjoy along the route. Greatest of all, of course, is the spectacular scenery of the Grand Canyon itself, along with its geological and biological diversity. Remains of prehistoric and historic groups are also popular attractions. Mallory's Grotto, a collection of pictographs on the canyon wall just past the first tunnel, and the other pictographs found beyond Mile-and-A-Half-House are points of interest. At Phantom Ranch, the Bright Angel site interprets for the visitor what life was like for the Anasazi Indians who

dwelled there from AD 1060 to 1150. It is the only excavated and stabilized interpretive archaeological site in the inner canyon. Near the site is another point of interest, the grave of Rees Griffiths, who died during construction of the South Kaibab Trail in 1922. The old Cameron mining adits located at the base of the Devil's Corkscrew remind today's visitor of a time when the canyon's value was measured in terms of mineral deposits.

When the Santa Fe Railway began service to the South Rim in 1901, the tourism era at Grand Canyon truly began. The Santa Fe, like other major western rail companies, played a key role in the establishment and development of national parks by promoting them and thereby gaining popular support for their preservation. The government and corporations had a symbiotic relationship during the formative years of National Parks and Monuments. The government could preserve and manage scenic areas as parks, but had little money for development, while corporations relied on the government to establish and maintain scenic areas as parks and provided capital to build and promote tourist facilities. The Grand Canyon South Rim was Santa Fe's centerpiece; the Union Pacific promoted the Grand Canyon North Rim, Bryce, and Zion Parks; and the Northern Pacific promoted Yellowstone (Runte 1984).

During the first decade of operation, Phantom Ranch had a reputation as a small exclusive resort for the rich and famous luminaries of the booming 1920s. Dude ranches and resorts were built across the desert west at that time to

accommodate oil and steel magnates, movie stars, authors, and other affluent individuals. Through the years, with addition of more facilities, the ranch became the domain of middle class tourists. Phantom Ranch was unique among resorts because of its difficult access, but it can be compared with similar western resorts which were built during the same time period. Dude ranches appeared in places like Tucson, Wickenburg, the Phoenix area, Palm Springs, and other Southwest locations. Phantom Ranch is also comparable with National Park Service lodges built during that time period. Zion Lodge in Utah followed the same general plan of Phantom Ranch, with a central lodge surrounded by guest cabins. Some researchers suggest that Park Service Director Stephen Mather was favorably impressed by the informal design of Phantom Ranch and encouraged the use of similar plans elsewhere (Tweed, Soulliere, and Law 1977: 43).

The tourist facilities at Phantom Ranch can be viewed in the context of both nation-wide railroad promotion of western national parks and western resort development. Since the area is an internationally renowned tourist destination point, it is significant within the theme of tourism at the national level. The major dates for this theme are from 1891 (the earliest construction date for the Bright Angel Trail), to 1943.

The properties that can be associated with this theme are: the Bright Angel Trail (including intact portions of the original trail and trailside attractions), the trailside

shelters (#s 141, 142, 143, and 179), the River Trail, the Kaibab Suspension Bridge, and the various Phantom Ranch tourist concession buildings.

Architecture: Period of Significance, 1922-1943

Chapter Three provides the context for evaluating the architectural significance of buildings and structures in the district. In summary, the Craftsman style bungalows designed by Mary E.J. Colter for Phantom Ranch, and the later NPS Rustic style structures are architecturally related to each other. Both the Colter Craftsman bungalows and the NPS Rustic buildings were products of their time, when the romanticism of nature was interpreted through architecture. A survey of Rustic architecture conducted by Tweed, Soulliere, and Law (1977) allows comparisons to be made with Rustic styles at other National Parks throughout the United States, and the district contains good representations of the style. Within the theme of architecture, the district is significant on a national level.

The architectural period of significance begins in 1922, with construction of the first Phantom Ranch concession buildings (#s 883, 888, 890, 891, 892) and the USGS hydrographer residence (#869). Later buildings, like the Rock House (#154), River Ranger Station (#91), and the Indian Gardens Ranger Station (#93), are early examples of the Rustic style, which reached its florescence with CCC-built structures such as the trailside shelters (#s 141, 142, 143, 179) and Phantom Ranch mule barn (#222). Other buildings and structures which

are significant under this theme include the later Phantom Ranch concession additions (notably, the dining hall, shower house [#879], cabins, employee bunkhouse [#878], and trail-crew bunkhouse [#875]), the Rock House bridge, and the Santa Fe pumphouses (#s 20 and 31) and rock residence (#18) at Indian Gardens. The architectural period of significance ends in 1943, when the latter structure was rebuilt after being destroyed in a fire.

Transportation: Period of Significance, 1891-1939

The actual use of the Bright Angel Trail corridor dates to the far distant past, when prehistoric Indians followed the fault line to reach water and farmland at Indian Gardens and the Colorado River. However, the earliest tangible remains of a transport route date to 1891, so that is considered the beginning date for this period.

The trail system, primarily a route designed for hiker and mule traffic into and out of the canyon, was first built for mineral transport. Historically it also served as the quickest and easiest passage across the Grand Canyon to the North Rim and Arizona Strip country. In 1903, when "Uncle Dee" Wooley, his son-in-law David Rust, and others formed the Grand Canyon Transportation Company, they had just that idea in mind. The route up Bright Angel Canyon to the North Rim had only been 'discovered' the year before by the first Grand Canyon cartographer, Francois Matthes, and it was a primitive route indeed, but better than the alternative. That involved traveling along dirt (or mud) roads through the Navajo Indian

Reservation, crossing the Colorado River at Lee's Ferry (if the ferry was operating), and continuing for more desolate miles up to the Kaibab Plateau. Travel to the North Rim by auto became much easier after a bridge spanning the Colorado River at Lee's Ferry was built in 1928, but the cross canyon route is still popular with hikers, and it is currently the only transcanyon trail system in the Grand Canyon.

The trail can be compared with other historic trail systems in the canyon, like the Tanner/Nankoweap and North/South Bass routes which historically provided access between both rims. There was a cable crossing over the treacherous Colorado River between the Bass Trails for a time, but otherwise, travelers had to risk a river crossing by boat, or when possible, could swim across during periods of low water levels.

Other significant historic transportation routes, including the various Mormon trails, existed during the same time in the region, but the Bright Angel Trail corridor is unique because wagons could not travel on its inclines. The trail system has the oldest continually operating river crossing in the 280 miles between Lee's Ferry and Pierce's Ferry. It is significant on a local level within the transportation theme, which spans the construction dates of 1891-1939.

Politics/Government: Period of Significance, 1908-1943

The district is significant for its association with several governmental agencies during their early years of development. Between 1893 and 1908, the Grand Canyon was in

a Forest Reserve nominally administered by the General Land Office in the Department of Interior. Direct government control by agents in the field did not occur until 1908, when the new Forest Service agency in the Department of Agriculture took over the redesignated National Monument. Although the Forest Service effectively managed the Monument, their efforts to regulate the Bright Angel Trail corridor were stymied by Cameron's mineral claim holdings and their inability to win title through litigation. In 1919, when the Grand Canyon became a national park, the three-year old National Park Service in the Department of Interior gained jurisdiction and continued the court battle to oust Cameron from the corridor.

The fight for control of the Bright Angel Trail became a national issue in 1922 when then Senator Ralph Cameron infuriated Congress by attempting to block the yearly operating funds for Grand Canyon National Park. Cameron's attempts to use his official position to promote his private business dealings eventually brought him the disfavor of the voting public and in 1926 he lost his Senate seat. The National Park Service obtained the trail deed in exchange for a new road in 1928.

The NPS immediately began improvements to the trail and Indian Gardens, and initiated a program of interpretation and visitor protection. They eventually reconstructed the entire length of the trail and built four trailside shelters for hiker's comfort. The latter were constructed by Civilian Conservation Corps forces, who greatly changed the appearance

of the inner canyon during the Great Depression years. The several hundred young CCC enrollees planted trees, created irrigation systems, and built some of the more significant Rustic structures.

Because the corridor is still controlled by the National Park Service, this theme extends up to today, but the period of significance is from 1908, when government control effectively began with the Forest Service, to 1943, the end of the historical period. Because the governmental agencies associated with this theme are national agencies, the district is significant on a national level under the theme of politics/government. Those structures which are significant under this theme are: the Bright Angel Trail, the trailside shelters (#s141, 142, 143, and 179), the Indian Gardens Ranger Station (#93), the River Trail, the Kaibab Suspension Bridge, the STP Operator's Residence (#869), the Rock House (154), and the River Ranger Station (#91).

A building or structure may be historically significant, but to be considered a contributor to the district and worthy of preservation, it must possess integrity.

Integrity

The National Park Service has identified seven ways that integrity applies to historic resources: location, design, setting, materials, workmanship, feeling, and association. Integrity is a quality which is difficult to measure and impossible to quantify. Either a structure

possesses integrity or it does not. The following considerations guided my determination of whether individual structures in the district possess integrity, based on physical examination.

Integrity measures a property's historic identity, judged by whether it retains the essential physical characteristics that existed during the period in which the property gained significance. For example, a structure that is significant as an example of Rustic architecture must retain most of the design elements that identify it with the Rustic style: rock foundations, walls, and/or piers; board-and-batten or exposed plank walls; low pitched gable roof; simple structural detailing; rectangular massing; symmetrical rhythm; etc. The criteria recognizes that structures change with varying needs through time. When alterations and/or additions have been made, historic materials and distinguishing features associated with the period of significance must survive largely intact and undisturbed. Most of the significant historic features of the structure should be visible on the primary elevation.

The original Bright Angel Trail provides an example of the integrity issue. The trail is considered to have integrity if it is physically identifiable and possesses the essential qualities it held during the period in which it gained significance (ca. 1891-1939). Its preservation potential lies in whether original engineered features like water bars, retaining walls, and treads remain. Although the original alignment of the upper trail section is faintly

visible from the Trail View Overlook on the West Rim Drive, that section lacks integrity because in 1933 the CCC obliterated the structural trail components. Conversely, the Salt Creek-Devil's Corkscrew section does possess integrity because the trail, while naturally eroded, retains the essential physical characteristics that it historically held. Stone embankments and wooden treads still remain; Ralph Cameron would recognize the trail's features.

Summary

The district as a whole is historically significant within the realms of tourism, architecture, transportation, and politics/government. All individual properties within the district which have historic association with one or more of these themes, and which possess integrity are considered to be contributors to the district. They are listed and discussed in Chapter 7, where I have delineated district boundaries. Management concerns and issues which arise in deciding how to draw boundaries in a rural historic district are also discussed.

Chapter 7

BOUNDARY DELINEATION

Introduction

National Register guidelines regarding delineation of historic district boundaries were conceived primarily with the urban environment in mind. Attention has only recently been focused on the rural historic district and its unique components (see Melnick 1984). The following discussion explores some of the issues involved in delineating district boundaries in a wilderness setting, using the proposed district as an example.

Contributing Elements

The proposed Cross Canyon Corridor Historic District is a network of trails which span the Grand Canyon from rim-to-rim, along with associated features and development areas. The district contains many components, but this thesis focuses only on it's main core: the present and original Bright Angel Trail, the River Trail, trailside shelters, and development areas at Indian Gardens and Phantom Ranch. The following discussion applies to the study area alone, but these ideas may also apply to the remainder of the district. Specifically, the study area contains the following contributing elements:

Trails

* The Bright Angel Trail, from the trailhead at Kolb Studio to the Colorado River.
* Intact sections of the original Bright Angel Trail, specifically, the Salt Creek-Devil's Corkscrew section between Indian Gardens and Pipe Creek.
* The River Trail, between the Bright Angel Trail and the South Kaibab Trail.
* The North Kaibab Trail, from the Colorado River to Phantom Ranch.

Development Areas Along Trails

* Indian Gardens.
* Phantom Ranch.

Trailside Attractions

* Four trailside shelters.
* Archaeological features: pictographs near the trailhead and just past Mile-and-a-Half Trailside Shelter; the Bright Angel Site near Phantom Ranch.
* The grave of Rees Griffiths.
* Cameron mining adits.
* Kaibab Suspension Bridge.

Defining the District Boundary: Some Considerations

There is no single formula which can be used to determine the edges of historic districts, since the nature of historic resources varies considerably from place to place. Many factors can affect delineation of boundaries, such as

historic association, distribution of significant features, property lines, political boundaries, integrity of the resource, research value, topographic features, and visual qualities (National Trust for Historic Preservation 1976: 13-17).

Based on the above considerations, and on information derived from the developmental history and district evaluation chapters, decisions about which features should be included within district boundaries become relatively clear. This chapter explores questions on how the boundary will be drawn: how wide or narrow it should be, whether topographic features should be incorporated, and how much of the natural setting is significant and thus worthy of inclusion. Many of the ideas used here are derived from the National Trust for Historic Preservation publication A Guide to Delineating Edges of Historic Districts (1976).

National Register properties have two features which are important to preserve: historic fabric and historic setting. Historic fabric is the material which comprises the structure, such as wood, rock, hardware, windows, and so forth. The historic setting or scene is the natural backdrop to historic structures, or the place where a historic event occurred (Melnick 1984: 66). Boundaries should be drawn wide enough around a resource to ensure that it's historic fabric is protected from direct damage resulting from nearby projects, or from neglect. The historic setting should also be protected so that any development near the historic

resource does not alter it's setting or character. Coincident with these concerns is the management problem of creating district boundaries which are logically defined, consistent, and clearly identifiable.

The Historic Scene

Much of the character and visual importance of development areas and trails is derived from their geographic location within the Grand Canyon, which forms the historic setting or backdrop for the structures in the district. Canyon vistas must have influenced decisions on where to place historic buildings and structures, but how strong a consideration this was is not known. Certainly water and engineering requirements dictated where many would be built, but the Park Service always reviewed plans for new construction to ensure harmonious development with both the existing architecture and the landscape. Since Rustic architecture emphasized the natural surroundings of structures, it is important to preserve the natural setting in the district as part of the historical scene.

How much of the natural setting, though, can be included within the district? Some vistas take in many miles of canyon views, while others are within narrow canyon walls. It is impractical to include very large areas within the district boundary, fundamentally because it must be established that the vista is a significant historic resource itself. For instance, Three-Mile Trailside Shelter is dramatically sited on a prominence above the Redwall Limestone,

with spectacular views as both a backdrop to the structure and as vistas from it. However, its location is also a convenient stopping point for hikers, since there is a shelter every 1.5 miles between the South Rim and Indian Gardens. It is also located on the water pipeline, which supplies each shelter with a drinking fountain. There is no proof that park planners intentionally built the structure at that point because of the surrounding vista, and therefore it is difficult to justify the inclusion of the vista as a contributor within district boundaries. Furthermore, there are potential legal questions which might arise from including in the district such large landscapes which are significant only as they relate to the smaller collection of historic properties.

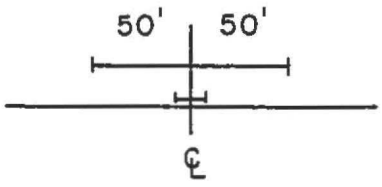
Vistas may more practically be considered under the provisions of the National Historic Preservation Act. The key regulation regarding adverse indirect impacts to the district resulting from visually intrusive projects is found in 36 CFR 800.9 "criteria of adverse affect," which states, among other things, that a historic property may suffer adverse impact from: "isolation from or alteration of its surrounding environment," or "introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting" (Federal Register: October 15, 1985). Therefore, even though a particular area may not be included within district boundaries, the impacts of any proposed project on the visual integrity of the district must be considered before the project is undertaken.

Boundary Width

Still, the basic problem remains of how wide to make the boundary. Guidelines state that boundaries should include a buffer zone around significant structures and buildings, but allow the individual researcher to decide how large the buffer zone should be (National Trust for Historic Preservation 1976: 13). Since the immediate natural setting surrounding significant structures is important to preserve, I considered using the following formula for marking boundary edges. It uses such natural features as canyon walls, dropoffs, and slopes as edges where practical.

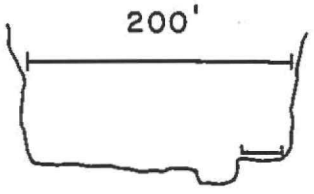
Trail Boundaries:

A). Fifty feet to either side of the trail centerline on flat, open land, or

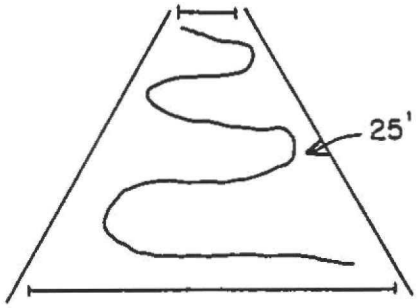


B). Natural features less than 50 feet from the trail centerline (cliffs or walls), or

C). Within canyons 200 feet wide or less, or



D). On exposed slopes (25 feet beyond the turns, encompassing all switchbacks).



Unfortunately, with this method it is difficult to communicate exactly where width changes would take place, and how they might undulate from one natural feature to another, such as when moving from a talus slope to a canyon. For administrative purposes, it is important to draw boundaries which are logically defined and clearly identifiable on the ground, so that those who manage the resource will know precisely where their responsiblities lie. Communication problems could result from using natural features as edges in a district as large and varied in topographic features as this one is.

A practical solution to the problem is to use arbitrary lines of convenience to establish standard-sized boundaries in most of the district. The boundary will be drawn at a standard distance from structures, depending upon the nature of the fabric. For example, all trails will have a standard boundary width of 50 feet to either side of the centerline, while isolated structures, including trailside shelters and attractions, will have standard perimeters of 150 feet; development areas are handled separately.

I chose boundary widths according to the nature of the structure and the potential for adverse impacts. The trails often run through terrain with cliff edges and canyon walls that are less than 50 feet wide to either side. Also, since the trails have low profiles, they would probably suffer less physical impact from any nearby disturbance. The standing structures and trailside attractions, however, require a

wider boundary to protect their superstructures and their setting from adverse impact. The development areas must be treated as separate entities with boundaries that encompass all structures. It would be interesting to test how disturbance from various projects impacts historic structures so that boundaries could be more accurate, but such an experiment is beyond the scope of this thesis.

Trails

Trails have a number of physical attributes which should be preserved, including: grades, water breaks, retaining walls, treads, and tunnels. These features illustrate construction methods in addition to being historic components.

Boundary Description. The district boundary begins at the Bright Angel Trailhead in the vicinity of Kolb Studio in Grand Canyon Village. The district encompasses the Bright Angel Trail, which proceeds through Indian Gardens to the Colorado River. Just below Indian Gardens, the boundary splits: one arm is the present trail along Garden Creek, and the other is the original Bright Angel Trail, which heads northeast on what is now known as the Tonto Trail for approximately 1,500 feet, and descends the Salt Creek drainage to Pipe Creek, where it rejoins the present trail. At the Colorado River, the boundary turns east along the River Trail, to where it meets the South Kaibab Trail above the Kaibab Suspension Bridge. From there, it crosses the bridge and joins the North Kaibab Trail. The district continues west along the North Kaibab Trail to the Phantom Ranch

development area, which terminates the study unit (refer to Figure 1 for trail locations).

The district boundary along the above described trails is 50 feet from the centerline, except where natural features are less than 50 feet away. This will adequately protect the trail fabric from adverse impact. Standard trail maintenance is not considered to be adverse impact, but should any structural changes be necessary, they should be reviewed for compliance with NHPA. In many places, steep ledges or canyon walls will necessitate narrower boundaries, but the maximum width for the boundary along trails is 50 feet from the centerline in any direction, except where trailside features or development areas occur.

Trailside Attractions

Contributing Features

1). Petroglyphs at Mallory's Grotto and just below Mile-and-a-Half Trailside Shelter.

2). The Bright Angel Site.

3). Rees Griffiths gravesite.

4). Cameron mining adits in the schist walls of Pipe Creek.

5). Kaibab Suspension Bridge.

Boundary Description. Trailside attractions will have a boundary extending 150 feet from their perimeters. Since only airspace surrounds the main section of the Kaibab

Bridge, the boundary there is restricted to the bridge itself, and it's anchors.

Trailside Shelters

Contributing Structures:

1). Mile-and-a-Half House (#141).

2). Three-Mile House (#142).

3). Indian Gardens Shelter (#143).

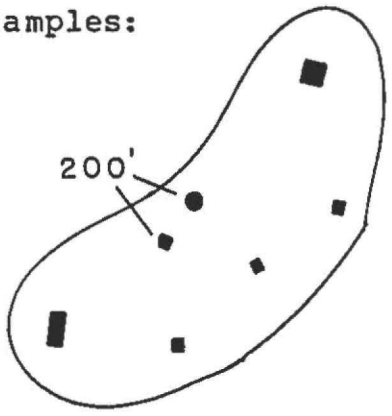
4). River Rest House (#179).

Boundary Description. The trailside shelters will have boundaries extending 150 feet beyond their perimeters, including approach steps, picnic areas, and other external improvements (refer to Figure 2).

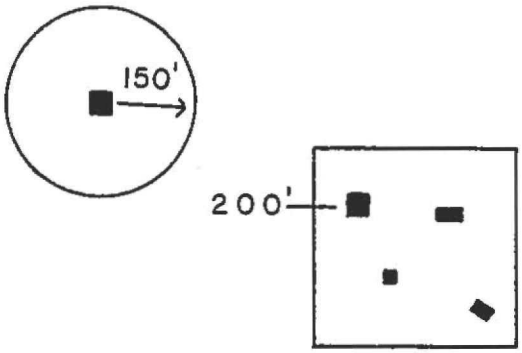
Development Areas

The most practical way to establish boundaries in development areas is to make them subdistricts with boundaries encompassing the entire development plus a buffer zone. Within the subdistrict, structures are judged to be either contributors or noncontributors to the overall significance of the district. The subdistrict boundary can be drawn several ways, as in the following examples:

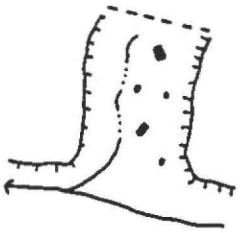
1). An irregular boundary which follows the contours of the development edge, with a 200 foot buffer zone on the outer perimeters of structures.



2). A geometric configuration, such as a circle with a standard radius, or a square encompassing all structures.



3). A combination boundary, as in connecting two points determined by other edge factors (like natural edges or limits of the settled area).



These various methods were considered when delineating boundaries in the district. The solutions arrived at for each subdistrict follow.

Sub-Districts

Indian Gardens

Because Indian Gardens is a long, narrow, and undulating development area without well-defined topographic features to use as borders, it presented the problem of where and how to set boundaries. Arbitrarily set boundaries seem to be the best solution for this situation. I decided upon a simple rectangle measuring 700 feet wide and 2,800 feet long. This dimension was derived by setting boundaries 200 feet distant from outermost structures in the development area: the mule barn on the south, the rock residence on the west, the lower pumphouse on the north, and the reservoir to the east. These points were then connected with straight lines, to form the

rectangle (refer to Figure 2). Within this boundary, the following structures are considered to be contributors and thus worthy of preservation.

Contributing Structures:

1). Caretaker's Cabin (#93).

2). Rock Residence (#18).

3). Pumphouse (#31).

4). Reservoir (#32).

5). Trailside Shelter (#143, see "trailside shelters").

6). Rehandling Pumphouse (#20).

7). Trail Maintainer's Tent Foundation.

Boundary Description. The boundary is a rectangle which surrounds the Indian Gardens development area. The southern boundary is located 200 feet south of the NPS mule corral (#B470), and it is 700 feet wide, with the trail at approximately centerline. The western edge is a straight compass bearing of 40 degrees east of north, and is defined as being 200 feet west of the NPS rock residence (#18). It runs north to a point 200 feet beyond the lower pumphouse (#20). Here it heads east for 700 feet, and from there runs south in a straight line parallel to the western one and 200 feet east of the reservoir (#32) to the starting point (see Figure 2).

Phantom Ranch

The natural situation at Phantom Ranch makes boundary selection relatively easy: steep canyon walls and the Colorado River are convenient and readily distinguishable

edge markers. The northern boundary, however, is arbitrarily drawn. Table 4 lists those structures within the boundary which are considered to be contributors and thus worthy of preservation.

Table 4

Phantom Ranch Contributing Structures

National Park Service	Fred Harvey
1). Mule Barn #222	1-11). Guest Cabins: #880 #887 #881 #888 #882 #889 #884 #890 #885 #891 #886
2). Ranger Station #91	
3). The Rock House #154	
4). Residence #869	
5). Bunkhouse #875	
6). Rock House Bridge	
7). Rock piers for water/sewer line, vicinity of the NPS mule barn.	12). Wrangler Cabin #869
	13). Welcome Corral
	14). Employee Bunkhouse #878
	15). Showerhouse #879
	16). Manager Cabin #883
	17). Dining Hall #892
	18). Restrooms #894
	19). Employee Cabin #895
	20). Reservoir #897

Boundary Description. The southern boundary is the Colorado River, and the Silver and Kaibab Suspension Bridges mark the west and east east edges, respectively. The steep Bright Angel Canyon walls mark the east and west edges from the bridges to a point 200 feet beyond the northernmost structure in the development area: the water reservoir (#897). An arbitrary east-west line marks the northern edge of the subdistrict (see Figure 1).

Noncontributing Structures

Structures which do not contribute to the significance of the district are either too recent in age to be included (like the Phantom Ranch NPS storeroom [#871] and Adirondack Shelter [#288]), or lack integrity (like the Bright Angel Campground). As structures approach the 50 year age requirement for listing, they should be evaluated for their potential as contributing structures. Those structures which are considered to be noncontributors at this time are listed in Table 5.

Table 5

Cross Canyon Corridor Historic District
Noncontributing Structures

Phantom Ranch	Indian Gardens
1). Hiker Dorms: #s 899, 900, 901, 902	1). Barn #B470
2). Phantom Ranger Station #440	2). Bunkhouse #B473
3). Harvey Corral #872	3). Comfort Station #309
4). B. A. Campground	4). New Pumphouse #484
5). Campground Restroom #489	
6). Adirondack Shelter #288	
7). Delta Restroom #490	
8). Sewage Treatment Plant #491	
9). Storeroom #871	
10). Storage Sheds #1 and #2	
11). Silver Bridge	

Summary

This chapter completes the technical requirements for the National Register nomination of the proposed Cross Canyon Corridor Historic District in Grand Canyon National Park.

Park managers now have specific information regarding district boundaries and which structures are considered to contribute to the district's significance. The concluding chapter contains some recommendations for managers on how to preserve those significant structures. It also discusses some of the ways that historic preservation is being implemented by the federal government today.

Chapter 8

RECOMMENDATIONS AND CONCLUDING REMARKS

This study has explored several issues that the still growing field of historic preservation has only recently become concerned with. The Cross Canyon Corridor Historic District is located in an exceptionally scenic rural setting, and until recently, preservationists have ignored such resources in favor of urban streetscapes. Features such as trails, trailside shelters, foot bridges, reservoirs, and like historic features, are not normally considered in the context of preservation. The problem of how to delineate boundaries in a natural setting is also a relatively recent concern. Architectural analysis, recommendations for compatible additions and alterations, and suggestions for a cyclic maintenance program should all be part of a preservation package to be carried out routinely at the time of National Register nomination. Why nominate a structure, site, or district if provisions for their proper care and preservation are not recommended and acted upon?

Grand Canyon National Park now has a comprehensive management guide for the proposed Cross Canyon Corridor Historic District. Park managers can now follow through on the recommendations which have been forwarded; others follow.

Recommendations

First and foremost, the district should be formally nominated to the National Register of Historic Places. This action will give the district official recognition as a significant resource worthy of preservation. It will also make preservation tax incentives available to the Fred Harvey Company, perhaps encouraging them to carry out substantial rehabilitation efforts at Phantom Ranch.

Even without National Register status, the Park is obligated to care for eligible resources within its boundaries. The historic structures in the inner canyon have generally been neglected, and many are deteriorating from a lack of maintenance. Through time, neglect is as sure a means of destruction as outright demolition.

Now that the need for maintenance of inner canyon structures is recognized, the historical architect for Grand Canyon should estimate what must be done, how much it will cost, and request specific funding. Since federal funds for historic preservation are currently scarce, funding may only be available for the most basic of needs, like cyclic maintenance. Because government funding can change drastically from year-to-year, the historical architect should draw up plans for best-to-worst case scenarios. Plans could range from the best treatment structures would receive with unlimited funding to absolutely necessary stabilization measures which must be undertaken within an austere budget. Because structures have been neglected for so long, the initial outlay for structure maintenance may be large, but once that work is

completed, the Park should be able to sustain structural integrity with the regular maintenance staff, and only occasionally request expert assistance for special projects.

Not all of the historic structures must be maintained, however. The Salt Creek-Devil's Corkscrew section of the original Bright Angel Trail should be treated as a historic archaeological site and simply be protected from adverse impacts rather than actively stabilized. This treatment also applies to trailside attractions like the pictographs, trail maintainer's tent foundation, mining adits, and Rees Griffiths' gravesite. Archaeologists ought to continue to stabilize the Bright Angel Site periodically.

The inactive pumphouses at Indian Gardens might be considered for adaptive reuse, like storage, or even as residences. This action would allow the Park to remove incompatible additions like the former restrooms which are now being used for storage. A feasibility study of the proposed action would have to be made, including an assessment of the historic and engineering significance of the pumphouse machinery.

In this era of fiscal austerity, the budget set aside for preservation of significant historic structures is simply inadequate. Many inner canyon structures have only recently reached the 50-year mark that qualifies them for inclusion in the National Register. Grand Canyon National Park should plan for their long-term care now, but that requires money. In the private sector, rehabilitation tax credits have been a great stimulus for effecting historic preservation. These

incentives are not available to government agencies: consequently, funding must come from federal sources or from private donations. It is ironic that the federal government is the steward of historic preservation by virtue of legislation protecting government-owned properties, yet it cannot afford to care for its historical resources adequately at this time. Conversely, private historic properties are not protected by law, but tax incentives and other economic benefits have stimulated an enormous amount of preservation activity in the private sector. In this situation, federal managers must devise creative ways to care for their resources, and lobby for more federal dollars.

The Park might consider contacting large corporations to make tax-deductible donations for rehabilitation of significant structures. It could be fruitful to gather concerned individuals and groups and involve them in 'adopt-a-structure' programs, where donations of money or even labor would bring about rehabilitation of single or multiple structures. With educational programs, donations for preservation might be elicited from Park visitors. Precedents exist for these and other creative funding methods, like deeding or leasing structures to organizations in return for their rehabilitation. That solution may sometimes be controversial, however, as the following case illustrates.

The Ellis Island-Statue of Liberty Foundation has successfully raised 200 million dollars from corporations and the public to finance the statue's restoration this year. But when government officials proposed deeding one of the

Ellis Island buildings to a private firm for renovation into a luxury hotel, public protest brought about withdrawal of the offer. The private sector supports preservation of publicly-owned resources, but not at the expense of losing access to buildings of national importance. There are, however, many other examples of successful public-private partnerships in preservation.

A private group of equestrians called Battersea Co. Ltd. recently signed a lease agreement with the government for Harmony Hall, a 250-year-old mansion in Maryland. In exchange, the group agreed to spend $250,000 to rehabilitate the house (Preservation News December, 1985).

The Coast Guard has begun to grant long-term leases of unused lighthouse facilities to private, non-profit groups for adaptive reuse projects. Near San Francisco, one group turned a lighthouse into a bed-and-breakfast inn by using a Maritime Preservation Grant from the National Trust and National Park Service and donated materials and labor. Other lighthouse projects using similar funding resulted in creation of a youth hostel, an educational center, and a lighthouse museum (Historic Preservation December, 1985).

The Forest Service helps coordinate conservation organizations that build and maintain trails all over the United States. In the local area, the Coconino National Forest employs volunteers extensively, and the North Rim District of the Kaibab National Forest has also put volunteer trailblazers to work. The Park Service has a well-established

Volunteer-In-Parks (VIP) program which could implement similar programs for historic preservation.

At Grand Canyon, such a partnership resulted in the rehabilitation of the old restrooms at Desert View into a visitor contact station. Materials were purchased with corporate funds while volunteers and Park personnel provided labor. This idea could be used for larger projects at Grand Canyon. The Grand Canyon Pioneers Association, a local group interested in history, might be a good source of volunteer help for various projects, including fundraisers. The Grand Canyon Natural History Association, a non-profit research organization, could be a funding source for specific projects and a possible avenue for publicity and publications. Local hiking clubs, student groups, and others may also provide assistance. Examples of projects on government land using such sources of funding and labor abound.

At the Fort Davis National Historic Site, near El Paso, Texas, the Friends of Fort Davis rehabilitated the interior of several barracks. They used volunteer help and funds from the National Park Service, a private foundation, and park visitors (Preservation News May, 1985). A similar example is the rehabilitation of Silcox Hut, a 1939 lodge on Mount Hood which had stood vacant on Forest Service land since 1962. The Friends of Silcox raised $200,000 to turn the empty hut into a hostel and restaurant for mountaineers. They received donations from a local contractor and the Xerox Corporation (Preservation News May, 1985).

A case of preservation in action that might be comparable to what could be carried out at Grand Canyon occurred at Carlsbad Caverns, where the National Park Service along with the Youth Conservation Corps and other volunteers rehabilitated the natural interior of the caverns themselves. They reattached stalactites and cleaned up mud and debris (Preservation News April, 1985).

All of these preservation efforts share two essential ingredients: organization and education. Public education about the district and the park's preservation goals may bring money and/or volunteers to the park. Publication of a popular book or even small pamphlet about the district would be a positive step toward that end. Tours of Indian Gardens and Phantom Ranch, modeled after historic home tours now conducted in urban historic districts might also be considered. It is important that tourguides (VIPs or staff interpreters) be properly trained in the history and architecture of the inner canyon. An alternative to guided tours might be a small self-guided tour booklet of the district. These tours or tour booklets would be a good source of donations for conservation of the historic structures. The public is more willing to support preservation projects which they understand and care about.

It is important that everyone in the Park who is involved with the historic district learn about its history, its individual structures, and why they are important to preserve. Disinterest or ignorance will eventually lead to neglect or improper care of the resources. Everyone should

know their responsibilities and carry them out correctly. One way to accomplish this is for the Park Service to publish the contents of this study. Individual sections might be given to different people who have an interest in a specific area. For example, interpreters would be interested in the developmental history of the district but would not need to know about cyclic maintenance.

The Fred Harvey Company, as a partner in historic preservation with the National Park Service, should be involved in the project as well. It may be productive to have an afternoon seminar with slide show presentation of this study's results, inviting interested individuals from the Park Service and the Fred Harvey Company. The meeting would include managers from both the Park and the Company, maintenance personnel, rangers, the Phantom Ranch staff, and others. With everyone in one room, the goals of the program will be communicated at once, and a spirit of cooperation may result. The public might benefit from a separate seminar.

Concluding Remarks

While the fieldwork for this study was conducted at Grand Canyon National Park, the findings can serve as a historic preservation model for other federal agencies nationwide. It is particularly adaptable for agencies which own historic properties in rural settings, like the National Park Service, the Forest Service, the Bureau of Land Management, the Bureau of Indian Affairs, the Coast Guard, and others.

The Park Service probably has the greatest need for a study such as this one because individual units like National Historic Sites, Historical Parks, Monuments, and Battlefields are often built around historical resources in rural areas. Also, many visitor facilities were developed during a time of great expansion and development at all National Parks: the 1920s and 1930s. Consequently, other Parks, like Grand Canyon, may find that they suddenly own a large number of structures which have only recently attained the 50 year age requirement for National Register eligibility. The pattern of growth at Grand Canyon is similar to that at other National Parks like Bryce, Zion, Yellowstone, Yosemite, Glacier, Sequoia, and others. This study can serve as a model to them, since they must deal with similar issues, and because the major historic themes identified for the district (tourism, architecture, politics/government, and transportation) are shared by them.

National Forests have also inherited historical resources like mining and ranching camps, concessionaire facilities, and trails, along with their own historic ranger stations, fire lookouts, and other administrative structures. The Bureau of Indian Affairs may have historic aboriginal structures and trading posts to care for, while the Coast Guard is concerned with lighthouses, and so on.

The exact nature of historical resources will vary among and within federal agencies, but the steps taken in this study could apply to all of them. In summary, a standard

historic preservation research program would consist of the following elements:

Inventory

Document and describe each structure (both historic and non-historic) within a potential historic district or other study unit, graphically and photographically.

Research

Using standard research techniques like archival search, oral history, and historical photograph analysis, determine dates of construction, modification, and/or removal for each structure. Write a narrative history of the area, and use this to identify major historic themes for the district or study unit.

Nominate

Complete the National Register Nomination process for the resource(s), as a district, site, building, structure, object, or multiple resource.

Protect

Sustain structural integrity with a cyclical maintenance program. Advocate integrity of design by enacting a design code based on an architectural analysis of existing historical structures.

Promote

Involve the public in the preservation program through education and promotion. Taxpayers appreciate seeing the successful use of tax dollars.

Caring for our historic cultural resources presents a challenge to federal managers. This study has merely set the stage for preservation of the Cross Canyon Corridor Historic District. Grand Canyon National Park can now set a favorable example for other governmental agencies to follow by acting on the recommendations contained in this study, for its successful completion.

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Mr. Gene Buell, United States Geological Survey, Flagstaff

Mr. Keith Green, Fred Harvey, Phantom Ranch, Grand Canyon

Mr. Marvin Hanchett, Mountain Bell, Flagstaff

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

BRIGHT ANGEL QUADRANGLE
ARIZONA—COCONINO CO.
15 MINUTE SERIES (TOPOGRAPHIC)

3556 IV (POWELL PLATEAU) | 3556 I (DE MOTTE PARK) | 3556 IV (NANKOWEAP)

112°15′ | 112°00′ | 36°15′ | 36°00′

JACOB LAKE (U.S. 89) 39 MI.
ENTRANCE STA. 7.7 MI.
PT. IMPERIAL 6 MI.

470 000 FEET | 1 900 000 FEET | 410 000 FEET | 1 830 000 FEET

Figure 1

Overview of the Proposed
Cross Canyon Corridor Historic District

Proposed District

Limit of the Study Area

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1954 and 1960. Field checked 1962

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona coordinate system, central zone
1000-metre Universal Transverse Mercator grid ticks,
zone 12, shown in blue

Where omitted, land lines have not been established

UTM GRID AND 1962 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:62500

CONTOUR INTERVAL 80 FEET
DOTTED LINES REPRESENT 40-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

THIS MAP AVAILABLE WITH OR WITHOUT SHADED RELIEF

ROAD CLASSIFICATION
Medium-duty — Light-duty
Unimproved dirt

QUADRANGLE LOCATION

BRIGHT ANGEL, ARIZ.
N3600—W11200/15

1962
MINOR CORRECTIONS MADE 1967
AMS 3556 II—SERIES V798

INTERIOR—GEOLOGICAL SURVEY,
RESTON, VIRGINIA—1975

Figure 2

THE BRIGHT ANGEL TRAIL

GRAND CANYON

ARIZONA

A new large-scale map of the world's most famous footpath

Surveyed and edited by Bradford Washburn, with the assistance of Barbara P. Washburn, Harry R. Feldman, Wendell Mason and a large number of generous and enthusiastic volunteers. Special gratitude is expressed to the National Geographic Society and the National Park Service.

Distance measurements by K. & E. Laser Ranger instruments. Angular measurements by Wild T-3 theodolite. Based on 1973 aerial photography. Photogrammetry and cartography by Swissair Photo & Surveys Ltd., Zurich. Printed at the Swiss Federal Institute of Topography, Wabern.

- Bright Angel Trail
- Other important trails
- Tunnel
- Resthouse, Emergency telephone
- Evergreen forest
- Evergreen trees
- Cotton wood
- Dense scrub
- Scattered or isolated big bushes
- Small bushes
- 6853 Spot height
- Roads, parking areas
- Railroad, bridge
- Stone wall, fence
- Buildings
- Watertank, bridge, culvert
- 1 Permanent water course, 2 River, 3 Rapids, 4 Sandbars, 5 Dry water course, 6 Cliffs or rocky ground 7 Boulder Field 8 Rocks or big boulders
- △6978.7 Survey control point
- USGS BM 2775.13 ft. ⊗ Benchmark

Elevations in feet

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Scale 1:4800 (400 feet to one inch)

Contour interval 25 feet

0 0,1 0,2 0,3 Miles

0 500 1000 1500 Feet

0 100 200 300 400 500 Meters

Transverse Mercator Projection
1000-foot grid based on Arizona coordinate system, central zone.

Grid-North
Magnetic North

Grid-Magnetic Angle 1981 for the center of the sheet: 15°E

Distances and Altitudes
(Photogrammetric Leveling)

Point	Altitude feet	Miles to S. Rim	Miles to River	Miles to Phantom Ranch
S. Rim	6845	0	7.81	9.68
Tunnel	6761	0.15	7.66	9.53
1	6630	0.40	7.41	9.28
2	6364	0.73	7.08	8.95
Tunnel	6248	0.87	6.94	8.81
3	6218	0.90	6.90	8.77
4	6153	0.98	6.83	8.70
5	6073	1.08	6.73	8.60
6	6007	1.16	6.65	8.52
7	5946	1.24	6.57	8.44
8	5900	1.30	6.51	8.38
9	5780	1.48	6.33	8.20
Rest House	5714	1.58	6.23	8.10
10	5692	1.62	6.19	8.06
11	5644	1.70	6.11	7.98
12	5582	1.80	6.01	7.88
13	5518	1.91	5.90	7.77
14	5443	2.02	5.79	7.66
15	5407	2.10	5.71	7.58
16	5305	2.25	5.56	7.43
17	5244	2.33	5.48	7.35
18	5197	2.39	5.42	7.29
19	5165	2.43	5.38	7.25
20	5133	2.48	5.33	7.20
21	5097	2.52	5.29	7.16
22	5056	2.58	5.23	7.10
23	4978	2.68	5.13	7.00
24	4955	2.71	5.10	6.97
25	4897	2.78	5.03	6.90
26	4855	2.84	4.97	6.84
Rest House	4733	3.01	4.80	6.67
27	4663	3.10	4.71	6.58
28	4512	3.29	4.52	6.39
29	4396	3.44	4.37	6.24
30	4255	3.62	4.19	6.06
31	4208	3.69	4.12	5.99
32	4093	3.92	3.89	5.76
33	4029	4.09	3.72	5.59
34	3884	4.36	3.45	5.32
35	3810	4.57	3.24	5.11
36	3764	4.68	3.13	5.00
37	3700	4.83	2.98	4.85
38	3675	4.92	2.89	4.76
39	3654	4.99	2.82	9.45
40	3589	5.20	2.61	4.48
41	3545	5.34	2.47	4.34
42	3493	5.46	2.35	4.22
Unconfmty	3460	5.52	2.29	4.16
43	3388	5.71	2.10	3.97
44	3366	5.75	2.06	3.93
45	3353	5.78	2.03	3.90
46	3332	5.90	1.91	3.78
47	3286	5.99	1.82	3.69
48	3190	6.19	1.62	3.49
49	3094	6.35	1.46	3.33
50	2998	6.48	1.33	3.20
51	2950	6.54	1.27	3.14
52	2903	6.61	1.20	3.07
53	2773	6.77	1.04	2.91
54	2733	6.91	0.90	2.77
55	2694	6.99	0.82	2.69
56	2629	7.13	0.68	2.55
57	2610	7.24	0.57	2.44
58	2588	7.29	0.52	2.39
59	2540	7.45	0.36	2.23
60	2504	7.54	0.27	2.14
61	2471	7.64	0.17	2.04
Rest House	2453	7.73	0.08	1.95
62	2446	7.74	0.07	1.94
ColoradoR.	2410	7.81	0.00	—

River Trail
(in miles)

	Miles to South Rim	Miles to Phantom Ranch
Pipe Creek Junction (2446'/746m)	7.74	1.94
Telephone line crosses trail	8.19	1.49
Wind and Water sign	8.41	1.27
South end of Silver Bridge	8.93	0.75
Inner Canyon Ranger Station	9.15	0.53
Trails Junction	9.20	0.48
Bright Angel Campground	9.25	0.43
Phantom Ranch (2546'/776m)	9.68	0.00

Plateau Point Trail
(in miles)

	Altitude in feet	Miles to Indian Gardens
Indian Gardens	3764	0.00
P-1	3730	0.17
P-2	3720	0.35
P-3	3711	0.52
P-4	3705	0.61
P-5	3706	0.75
P-6	3724	0.98
P-7	3741	1.14
Plateau Point	3781	1.46