
UTAH GEOLOGICAL AND MINERALOGICAL SURVEY
affiliated with
THE COLLEGE OF MINES AND MINERAL INDUSTRIES
University of Utah, Salt Lake City, Utah

KANAB
THE SOUTHERN GATEWAY
TO UTAH

Bulletin 49 • Price \$.75 • February 1963



UTAH GEOLOGICAL AND MINERALOGICAL SURVEY

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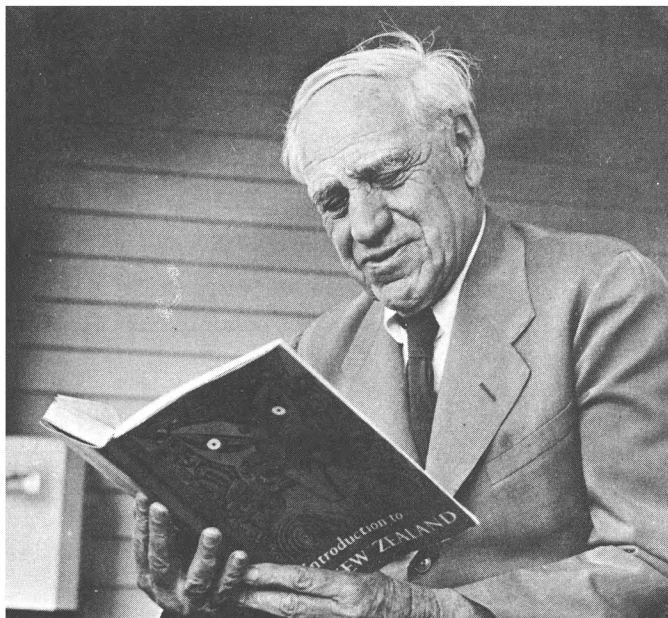
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KANAB SOUTHERN GATEWAY TO UTAH

by Dr. Herbert E. Gregory



Herbert E. Gregory, in about his eightieth year
1869-1952



Utah Geological and Mineralogical Survey
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University of Utah, Salt Lake City, Utah

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FOREWORD

Doctor Gregory's interest in Kanab extended beyond the realm of geology and blended with the area's history. Thrilled by the artifacts of its ancient inhabitants, by the struggles of its pioneers, by the accounts of Powell and Delenbaugh who used the settlement for their headquarters, Doctor Gregory's manuscript dealt with all these subjects as well as with the forces that have carved the Earth on which the village sits. Those portions dealing with recorded history, about half the manuscript, together with all illustrative material not used herein, have been entrusted to the Utah Historical Society. The balance, herewith presented by the Utah Geological and Mineralogical Survey as Bulletin 49, is perhaps one of the last manuscripts of Doctor Gregory that will be published. A story in Educational Geology, we think of it as a memorial to its author--in the words of Arthur L. Crawford, "one of the finest gentlemen, the truest friend, the most illustrious scientist, and one of the most sympathetic of humanitarians--Dr. Herbert E. Gregory."

Many people and organizations have contributed illustrative material toward the completion of this paper. In the form in which it has been published, much could not be used, but to everyone, and particularly to those who have waited patiently for its appearance, we express our thanks.

The Staff
December, 1962

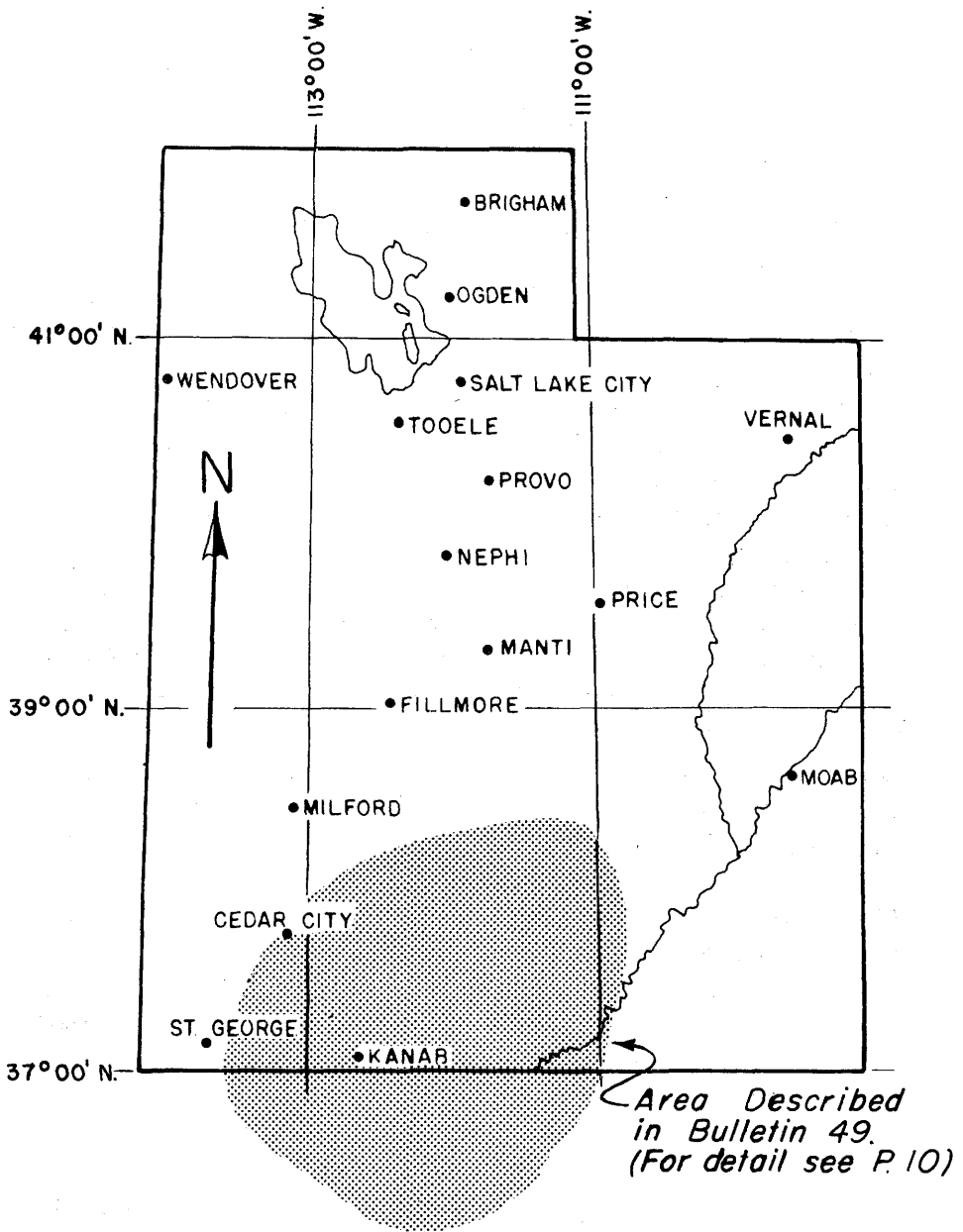


Figure 1. Outline Map of the Area.

KANAB THE SOUTHERN GATEWAY TO UTAH

by Herbert E. Gregory

INTRODUCTION

The village of Kanab is a conveniently placed gateway to a region noteworthy alike for its people, its economic system, and its fascinating scenic setting. Its human history begins with the coming of the Basket Makers--hunters and farmers--who occupied favorable sites as early as 2,000 B.C. Their implements, textiles, and crude pottery are preserved in cliff caves on many canyon walls. A famous site is Cave Lakes Canyon from which Kanab obtains water for household use. As the dominant race in southern Utah, the Basket Makers gave way to the Puebloans, outlying settlers of the clans who cultivated fields and built the famous "Cliff Dweller" houses in the valleys of Colorado, New Mexico, Arizona, and Utah. The most elaborate structures are south and east of the Colorado River, where Pueblo civilization reached its cultural peak about 1,100 A.D. Kanab is built on the site of ancient Puebloan farms, and in nearby Sand and Johnson Canyons ruined houses are fairly well preserved.

In the succession of aboriginal tribes in Kane County, the Puebloans were followed by the Piutes. Escalante, who visited the Piutes in 1776, and the Mormons, who later took over their lands, describe these early settlers as shy, peace-loving, and fairly well adjusted to their physical environment. By ingenious methods they caught mountain sheep, deer, antelope and rabbits, porcupines, birds, lizards, and grasshoppers; collected piñon nuts, roots, and the seeds of sunflower and other annuals; and to supplement the food obtained by hunting, cultivated small irrigated fields of corn, beans, squash, and watermelons. Mormon pioneers found the Kaibabits (Kaibab) clan of Piutes attending their crops in Kanab and Johnson Valley and along

the base of the Kaibab Plateau. Though treated with kindness by the Mormons, these semi-nomadic people were unable to adopt the white man's mode of life. The Kaibabs, that in 1870 numbered "several hundred," are now represented by 80 people (1949), cared for by the Government on the Kaibab Reservation, near Moccassin, Arizona. They frequently come to Kanab.



"The Indians who live in the valley and its vicinity (Ash Creek Region, bordering Zion National Monument) are called in their language Huascari. They dress very poorly, and eat grass seeds, rabbits, pinon nuts in season and dates. ... These people are extremely timid. ... From here to the Rio Grande (Colorado River) all the land is poor, although it appears to be rich in minerals."

—Taken from Father Escalante's Diary, Oct. 15, 1776

Figure 2. Piute Women Seedgatherers (Photograph Courtesy of the Smithsonian Institute.)

CLIMATE AND VEGETATION

As elsewhere in the vast region drained by the Colorado River, the climate of inhabited places in southern Utah is semi-arid and characterized by wide annual, seasonal, monthly, and daily ranges in precipitation and temperature. At Kanab (altitude 4,925 feet), the mean annual precipitation is 13.18 in (7.29 inches for the driest year and 20.70 inches for the wettest year.) The heaviest precipitation, about 40 per cent of the annual, comes in January, February, and March, and the lightest in April, May, and June. At this station the average temperature for January is 32.3°F.; for July 74.1--the extremes are 106 and -20 degrees. Normally the lapsed time between the last killing frost of spring and the first killing frost of fall--the growing season for crops--is 151 days; in exceptional years, less than 120. Snow to a depth of a few inches covers the lower lands intermittently during December, January, and February; the maximum annual snowfall is 22 inches. On the higher lands north of the village, snow may fall any time between October and March and remain in sheltered places until April or May, and attain depths exceeding 30 inches. The best grazing lands are those that receive the most snow.

Because of the relatively short growing season, the country about Kanab is unfavorable for the growth of many desirable farm and garden crops and, except on canyon floors, for fruit trees. Adjustment has been made by the selection of plants suitable to the climate, and by supplementing the deficient rainfall by irrigation. However, the streams supply too little water and are too erratic in behavior to permit large scale irrigation farming.

The cover of vegetation--everywhere patchy and over considerable areas substantially absent--is characterized by many species, each represented by a few individuals classed as representatives of the Upper Sonoran and the Transition Zones. South of the Vermilion Cliffs, at altitudes of 4,000 to 5,000 feet, the most common plants are juniper and piñon which make up the "pigmy forest," cliff rose, gray sage, rabbit brush, black brush, "Brigham tea," and numerous

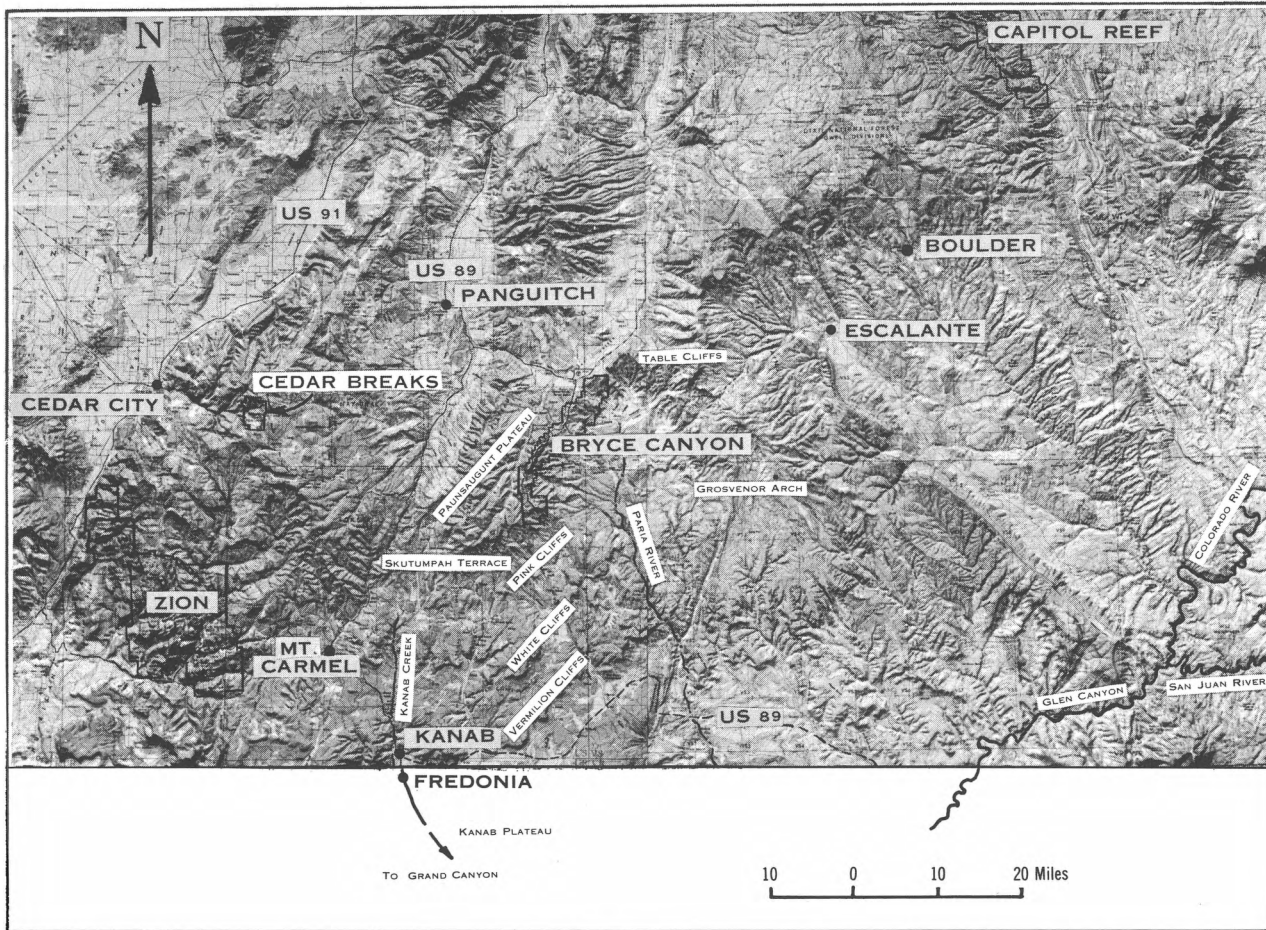
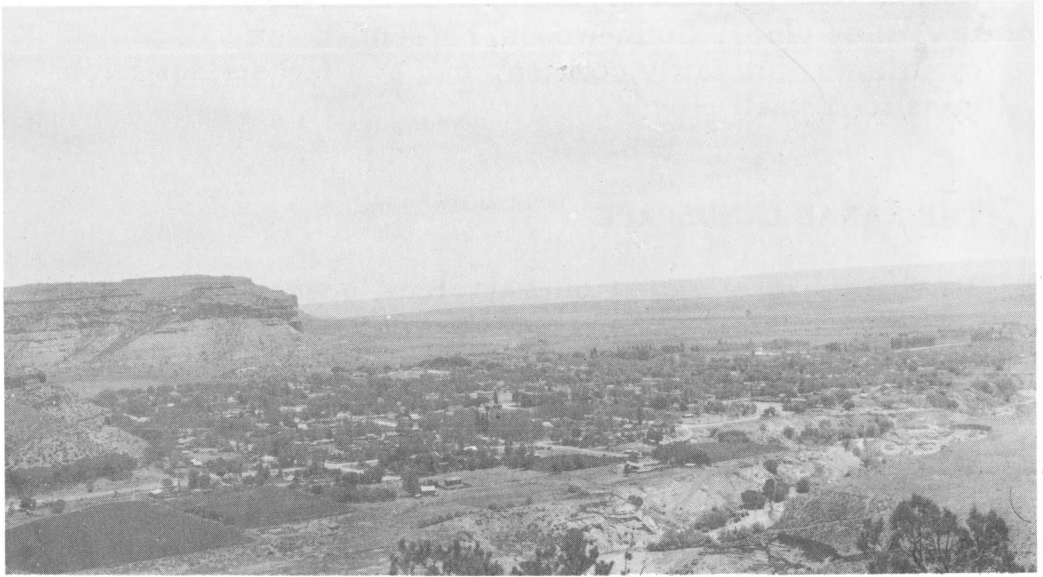


Figure 3. Map of the Kanab Region (Photograph from Army Map Series.)

annuals. These plants in less abundance grow along canyons and low divides at altitudes above 6,000 feet, where they are accompanied by mountain mahogany, manzanita, Gambel oak, serviceberry, several species of grass, and a few yellow pines. Cottonwoods, here and there accompanied by willows, are fairly common, and at a few springs birch trees form small groves.

THE KANAB LANDSCAPE

Kanab lies in a region of marvelous scenery and great scientific interest. The site of the village marks the boundary line between the Kanab plateau of Arizona and the High Plateaus of Utah, which together make up the most picturesque parts of Utah, Arizona, Colorado and New Mexico, known to geographers as the Colorado Plateau Province. About Kanab the outstanding topographic features of this vast region are fully displayed: table-like expanses of rock walled in by cliffs. In distant views, the flat areas seem unbroken and the lines of cliffs extend on and on until lost in distant haze. But nearby views reveal a ruggedness possessed by few other regions. The rock terraces are long or short, narrow or expanded over many square miles, and the bordering escarpments are tens or hundreds of feet high. Innumerable low benches and steps stand on the terraces, cling to the canyon walls, or are detached from the cliffs as isolated mesas. Especial ruggedness is given by the interlaced canyons. On large and small scale the topography is angular. The gentle slopes and sweeping curves that make up the artist's "line of beauty" are replaced by horizontal lines, vertical lines, and oblique lines that meet at angles, and along their trends are offset many times. The rounded hills, the gently inclined valley sides, the flat river bottoms of other regions are here represented by tables and walls. In the place of meadows are lowlands cut into angular forms that differ from their larger companions only in size. To those accustomed to scenery in which the greens and other subdued tones resulting from plant covering and gray rocks are dominant, the coloring of the Kanab landscape is amazing. Bands of red, brown, yellow, and white are every-



A

Figure 4

The village of Kanab, view facing easterly. (Picture courtesy of Evan Madsen.) Doctor Gregory described the power of the creek, flowing southward from A toward B in the lower right corner, in the following words:

"For 13 years after settlement (of Kanab) ... fairly satisfactory conditions prevailed, then abruptly came to an end; the life-giving Kanab Creek became an agent of destruction. The records show that the first great flood came in July 1883. It swept away all the farm lands and meadow lands in the canyon as well as the field crops just south of the village and scoured out a broad channel far below the intake of irrigation ditches. In 1884 and 1885 floods occurred daily for 3 or 4 weeks and continued the deepening of the new channel. As the result of 3 years' washing the stream bed was cut down about 60 feet beneath the former level, with a breadth of some 70 feet, for a distance of 15 miles. Much of this mass of material, measuring more than 12,000,000 cubic yards, was carried to the Colorado; much also was spread over the town lots of Kanab and the flat lands south of the village."

where conspicuous and in places the complex color scheme fully justifies the term "Painted Desert" or "Prismatic Plains." Over many square miles of cliff faces, mesas, buttes, lava flows, craters and terrace flats, the bed rock seems naked; vegetation is sparse, and the soil has been swept away by rain, wind, and streams--the only colors are those of the rocks themselves.

In southern Utah and northern Arizona the dominant topographic features are two platforms each thousands of square miles in area. The lower platform is the Kanab plateau that borders the Colorado River and extends northward to the Vermilion Cliffs. A mile above it stands the Paunsaugunt Plateau that extends northward into central Utah. In the face of these two great plateaus, terraces hundreds of square miles in area have been cut. The result is a gigantic rock stairway of uneven treads that leads from the flat surface on the Utah-Arizona line to the equally flat top of Pink Cliffs at Bryce Canyon National Park, some 40 miles distant. Along the line of Kanab Creek, four platforms constitute a series. The lowest is Kanab plateau, that from Kanab extends eastward toward Paria River and southward to Grand Canyon. It is an area of broad flat valleys, east-west trending flat ridges, and isolated mesas outlined by steep cliffs. Where they emerge from the Vermilion Cliffs, the streams that cross the plateau flow in shallow trenches that make possible the recovery of water for irrigation at Johnson, Kanab, and Fredonia. Elsewhere the plateau is a grazing ground for stock. The next highest step in this series is Wygaret Terrace, that terminates northward at the base of the White Cliffs and southward at the crest of Vermilion Cliffs. Its surface is roughly even except for rounded knobs which rise above it and short canyons sunk a few hundred feet below. On it grows pinon, juniper, and sage, and some shrubs and herbs suitable for sheep and cattle that find water at the few springs and ephemeral ponds. The third step in this series of platforms and cliffs is the Skutumpah Terrace--a broad belt of flat land crossed by south flowing streams that head in canyons and end in canyons. Southward it is sharply outlined by the White Cliffs, westward by the Elk-heart Cliffs--at Mt. Carmel. Northwards its general surface at an altitude of 7,000 feet merges with the low

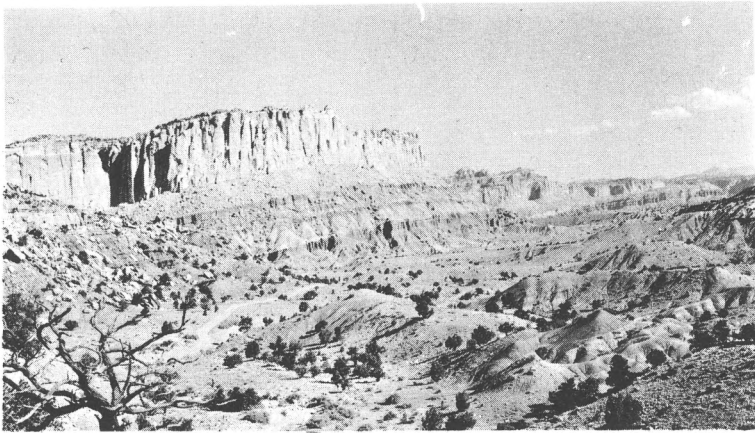


Figure 5

"... the harder rocks remain as cliffs and the protecting cap of mesas and ridges, while the softer ones are reduced to lowland plains."

Cliffs of Wingate Sandstone with their apron of Chinle shales. Rolling Moenkopi terrain in foreground. Capitol Reef National Monument (courtesy of National Parks Service—by Dodge.)



Figure 6

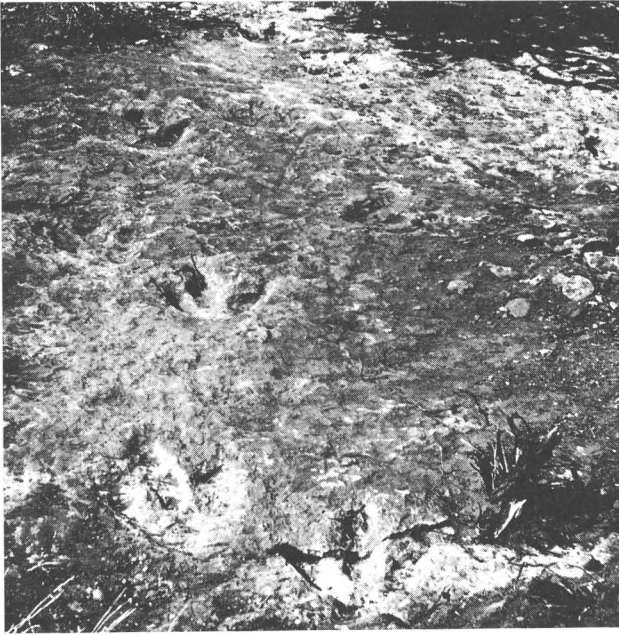
"...the thick sandstones decompose readily and some of the poorly consolidated shale and beds of loose sand seem literally to melt away..."

Bryce Canyon National Park (courtesy of Union Pacific Railroad.)

benches and escarpments that lead upward to the forest-clad Paunsaugunt Plateau--the highest bench in the series, 9,000 feet above sea level. This stairway is not visible from Kanab; the wall of Vermilion Cliffs blocks out the view. However, its cliffs and terraces are crossed on the road into Utah through Mt. Carmel and on to Bryce Canyon National Park. East of Fredonia, particularly where Highway 89 ascends the slope of Kaibab plateau, the rock stairway is revealed in all its magnificence. From the floor of Kanab plateau, here almost bare of vegetation and painted in attractive tones, rises abruptly the red wall of Vermilion Cliffs and back of it in turn the White Cliffs, the Gray Cliffs, the shining Pink Cliffs that rim the Paunsaugunt Plateau, and the towering Table Cliffs beyond. At no place in the plateau province is the characteristic landscape better displayed. Here may be had an uninterrupted view of a vertical mile of rock orderly arranged in layers that seem to compete with each other in attaining brightness of color and variety of decorative form.

STORY OF THE ROCKS

A vertical cross section of the rocks along Kanab Creek from the Colorado River to the top of the Paunsaugunt Plateau reveals beds of schist, sandstone, limestone, and shale, formed at different times and under diverse conditions. For convenience of study and description, these rocks are grouped according to age and further segregated into formations which include beds similar in composition and texture. The age groups known to geologists as eras and periods begin with Precambrian rocks of Archean age at the bottom of Grand Canyon, thought to be 1,300,000,000 years old. Successively above these lie the Algonkian, Cambrian, Devonian, and Tertiary. The strata given these respective age assignments together measure about three miles in thickness. They were not continuously deposited, one on top of the others, nor built up by the same agencies. At times the region about Kanab was covered by the sea, at other times by dry land and intermittently the sea bottoms and low lying plains which



"In them are embedded the remains of animals and plants characteristic of Triassic time."
Dinosaur tracks east of Kanab (courtesy of Earl

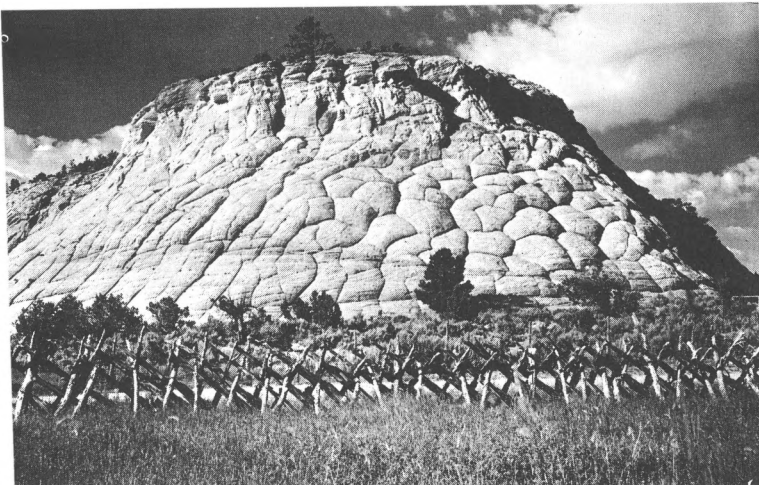


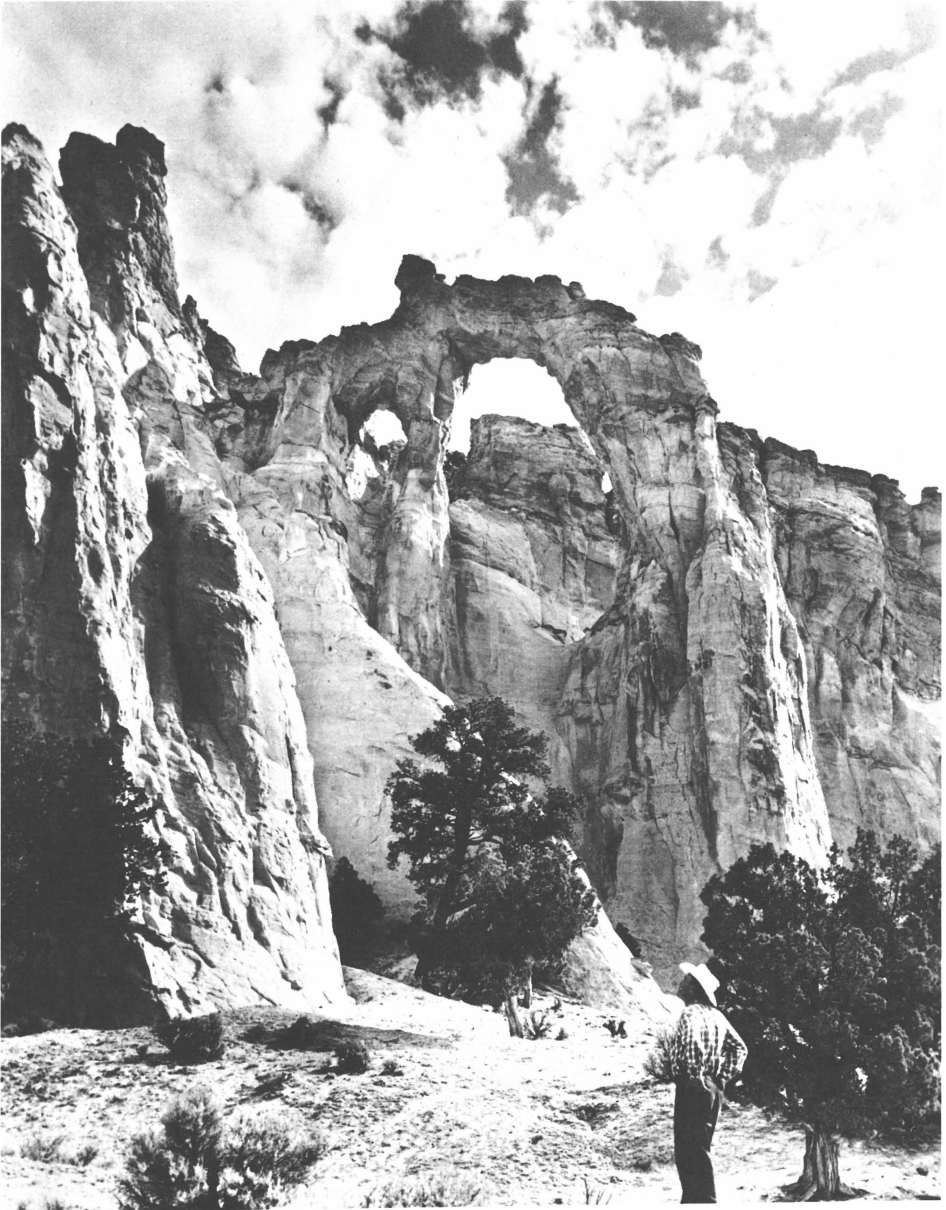
Figure 8

"The cracks outline the slabs and irregular chunks of rock that are intermittently detached from the cliffs by frost, rain, tree roots, and ground water."
Cross-bedded Navajo Sandstone of sand-dune origin near Boulder, Utah (courtesy of Utah Tourist and Publicity Council.)

served as a resting place for stream-borne material were uplifted, even fractured and upbowed, then worn down to lower levels by streams. The solid rocks of one era or formation were worn into gravels, sands, and muds, and re-distributed to form rock of a later period. Fossils in the strata show that the plants and animals of ancient times gradually gave way to forms like those of today.

The rocks that underlie Kanab and rise above the village in the Vermilion Cliffs are representative parts of the widely extended Chinle formation of Triassic age. Here the formation is about 1,000 feet thick. Its component strata are tilted slightly northward, and comprise essentially two groups. The lower group, called the Petrified Forest member, has been largely worn away. South of Kanab it is exposed in road cuts; along the Johnson road it forms the base of cliffs, and still farther east, in Paria Valley, it presents the marvelous colored landscape made famous in technicolor films. The upper part of the Chinle formation--known to geologists as the Upper Sandstone member--consists chiefly of red, fine-grained dense layers of sandstone 1 to 5 feet thick, interbedded with sandy shale. Because more resistant to weathering and erosion, this member remained in place while the weaker Petrified Forest member below it was being worn away. At Kanab and for many miles east and west, it is a prominent part of the Vermilion Cliffs. Though the rocks of the Chinle formation are remarkably varied in composition, texture, and color, all of them were laid down on land; they include no marine sediments. They reveal the presence of strong streams, weak streams, and shallow bodies of fresh water. In them are embedded the remains of animals and plants characteristic of Triassic times. Fossil fresh water fish are found in the cliffs back of the high school building, dinosaur tracks in rocks north and west of the village, and fragments of petrified trees in many places. These fossils show that the Chinle formation is about 180,000,000 years old.

The sandstone and shales exposed in the Vermilion Cliffs and in mesas and ridges all about Kanab are the edges of strata that extend underground northward and once extended



"They owe their present position and form to erosion by streams aided by rain, frost, and in some slight degree by wind."

Figure 9. Grosvenor Arch (Photo courtesy of Union Pacific Railroad.)

southward over Kanab Plateau to points beyond the Colorado River. They owe their present position and form to erosion. The thick pile of rock that in former geologic time covered the site of Kanab has been worn down to the present surface by streams aided by rain, frost and in slight degree by wind. In this process of tearing up the strata and ferrying the comminuted products to the Colorado River during the past million years, the streams have proceeded at varying rates. Their effectiveness has been controlled by the relative resistance to erosion of the rock encountered along their courses. The hard limestone and sandstones that make up the Vermilion Cliffs and White Cliffs are worn down slowly, the softer shales much less slowly and the loose sands and gravels rapidly. Consequently the harder rocks remain as cliffs and the protecting cap of mesas and ridges while the softer ones are reduced to lowland plains. Though in calendar terms, the wasting of solid rock in southern Utah is inappreciable, in geologic terms it is rapid; the conditions for erosion are exceptionally favorable. As compared with many other regions the thick sandstones decompose readily and some of the poorly consolidated shale and beds of loose sands seem literally to melt away during showers and spread mud over the farms, county roads, and village streets. The rounded quartz grains that make up the massive sandstones are held together by weak cement which is readily dissolved by rain that wets the walls and by water that seeps through the rock, thus loosening the tiny particles and permitting them to fall or to be swept from the cliff face by showers. The rock is thus reduced to sand which is easily removed by streams. Also favorable for destroying the sandstone are the cracks--horizontal, oblique, and curved--that traverse the canyon walls. The cracks outline the slabs and irregular chunks of rock that are intermittently detached from the cliffs by frost, rain, tree roots, and ground water. Even more favorable for rapid erosion is the rain which generally falls in torrential showers that sweep debris from hillsides and bring the stream to high water level. Floods fed by a single downpour lasting an hour and covering a few square miles have been known to remodel the topography to an extent that evenly distributed precipitation could not duplicate in tens perhaps hundreds of years. Erosion as



Figure 10

"Here may be had an uninterrupted view of ... rock orderly arranged in layers. ... the topography is angular."

Bluff, Utah (courtesy of George Watson.)



"... a ruggedness possessed by few other regions."

Figure 11. Glen Canyon (Courtesy of George Watson.)

controlled by climate and especially by relative rock hardness is responsible for all the topographic features in the Kanab region--the stupendous cliffs and canyons and the myriads of picturesque features. It is actively in progress today and its work is but partly done. So far the Vermilion Cliffs have been stripped back only about 50 miles and the floors of the canyons cut through them still lie more than 3,000 feet above their eventual position.

Progress in modeling the rocks may be illustrated by the topographic features developed by Kanab Creek. Along its course southward from the rim of the High Plateaus of Utah (altitude 8,000 feet) to the Colorado River (altitude 2,000 feet), the creek presents stretches of narrow canyon, wide canyon, terraced river flats, and low meadowlands. After receiving water from many canyoned rills that flow down the precipitous face of Paunsaugunt Plateau, it crosses the Skutumpah Terrace with low gradients in a broad valley, then descends steeply through a narrow gorge in the White Cliffs. Continuing across the Wygaret Terrace, its gradient decreases and on emerging from canyons cut through the Vermilion Cliffs the creek finds its course on a broad plain where it is so shallow and slow moving during dry seasons that it is barely able to carry the load of waste. Farther along its course, the Kanab descends swiftly through a gorge 20 to 50 feet wide, the bottom of which is level with the Colorado River. There is no reason to doubt that the entire Kanab Valley, 90 plus miles long, has been dug by Kanab Creek and its branches. It has been lengthened by head-water erosion, deepened by downcutting, and widened by tearing down the bordering rocks.

SELECTED BULLETINGS OF THE UTAH GEOLOGICAL SURVEY

Bulletin

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|-----|--|--------|
| 38 | Stratigraphy of the Burbank Hills, Western Millard County, Utah, by Richard W. Rush, 1951, 24 p., 6 figs. _____ | \$1.00 |
| 47 | Microfossils of the Upper Cretaceous of North-eastern Utah and Southwestern Wyoming, by Daniel Jones, David Gauger, Reed H. Peterson, and Robert R. Lankford, 1953, 158 p., 16 pls., 8 figs., 4 tables _____ | \$2.00 |
| 48 | Lower Ordovician Trilobites from Western Utah and Eastern Nevada, by Lehi F. Hintze, 1952, 249 p., 28 pls. _____ | \$4.00 |
| 53 | Silurian Rocks of Western Millard County, by Richard W. Rush, 1956, 66 p., 12 figs. _____ | \$1.50 |
| 54 | The Oil and Gas Possibilities of Utah, Re-evaluated, Compiled and Edited by Arthur L. Crawford, 1963, 525 p., 157 illustrations _____ | \$6.50 |
| 54a | Surface, Structure, and Stratigraphy of Utah, Sections I and II of Bull. 54, 1963, 160 p., 51 figs. _____ | \$4.00 |
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| 62 | Notch Peak Intrusive, Millard County, Utah, by Harry M. Gehman, Jr., 1958, 50 p., 4 pls., 12 figs., 3 tables _____ | \$1.50 |
| 63 | Geology of the Sheeprock Mountains, Tooele County, Utah, by Robert E. Cohenour, 1949, 200 p., 15 pls., 6 figs., 3 tables _____ | \$5.00 |
| 65 | Geology of the Stansbury Range, by John S. Teichert, 1949, 75 p., 2 pls., 12 figs. _____ | \$1.50 |
| 71 | The Mineral Resources of Uintah County, Utah, by Robert G. Pruitt, 1961, 101 p., 11 pls., 19 figs. _____ | \$2.00 |

WATER RESOURCE BULLETINS

- | | | |
|---|---|--------|
| 1 | Water Production from Oil Wells of the Uinta Basin, Uintah and Duchesne Counties, Utah, by Harry D. Goode and Richard D. Feltis, 1962, 32 p., 3 pls., 4 figs., 2 tables _____ | \$1.00 |
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MAPS

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- 3 - Colored Relief Map of Utah (formerly RS-22) _____ \$.50
- 4 - A Correlation Chart of Formations in Utah (formerly RS-25) _____ \$.50
- 5 - Geology of the Egnar-Gypsum Valley area, San Miguel and Montrose Counties, Colorado (formerly RS-27) _____ \$.50
- 6 - Geology of the West-Central part of the Gunnison Plateau, Utah, by Clyde T. Hardy and Howard D. Zeller (formerly RS-33a) _____ \$.25
- 7 - Index to Unpublished Geologic Thesis Mapping in Utah (formerly RS-58) _____ \$.25
- 8 - Colored Geologic Map of Utah, from Guidebook to Annual Brigham Young University geology field trip (see reprint 57, formerly RS-57a) _____ \$.15
- 9 - Physiographic Map of Utah (formerly RS-78) _____ \$.15
- 12 - Colored Geologic Map of Cache County, Utah, by J. Stewart Williams (formerly RS-64) _____ \$ 1.00
- 13 - Colored Geologic Map of Daggett County, Utah, by Howard R. Ritzma (formerly RS-76) _____ \$ 1.00
- 14 - Colored Geologic Map of Washington County, by Earl F. Cook (formerly RS-84) _____ \$ 1.00
- 15 - Colored Geologic Map of Salt Lake County (formerly RS-85) _____ \$ 1.00
- 16 - Colored Geologic Map of Uintah County, Utah, in two halves (formerly RS-90) _____ \$ 1.50
- 17 - Mineral Resources Map of Uintah County, by Robert G. Pruitt _____ \$.35
- 18 - Earthquake Fault Map of a Portion of Salt Lake County, Utah _____ Free

MAPS AVAILABLE THROUGH THE SURVEY

The Great Salt Lake, Utah, by Armand J. Eardley (formerly RS-88) _____ \$.50

Wildcat Map of Utah (42" x 50"), by Utah Oil Report--kept up to date _____ \$10.00

Geologic Map of Utah, Northeast Quarter _____ \$3.50 (by mail \$4.00)
Northwest Quarter
(available Winter '62-'63)

Various plates from Utah Geological Society and Intermountain Association of Petroleum Geologists Guidebooks.

PUBLICATIONS HANDLED THROUGH THE UTAH GEOLOGICAL SURVEY

Utah Geological Society -- Guidebooks

3 -	Geology of the Utah-Colorado Salt Dome Region, with emphasis on Gypsum Valley, Colorado, 1948 _____	\$ 2.50
4 -	The Transition between the Colorado Plateaus and the Great Basin in Central Utah, 1949 _____	\$ 3.00
6 -	Geology of the Canyon, House, and Confusion Ranges, Millard County, Utah, 1951 _____	\$ 4.00
8 -	Geology of the Central Wasatch Mountains, Utah, 1952 _____	\$ 3.50
9 -	Uranium Deposits and General Geology of Southeastern Utah, 1954 _____	\$ 3.00
10 -	Tertiary and Quaternary Geology of the Eastern Bonneville Basin, 1955 _____	\$ 4.00
11 -	Geology of Parts of Northwestern Utah, 1956 _____	\$ 4.00
12 -	Geology of the East Tintic Mountains and Ore Deposits of the Tintic Mining Districts, 1957 _____	\$ 4.00
13 -	Geology of the Stansbury Mountains, Tooele County, Utah, 1958 _____	\$ 4.00
14 -	Geology of the Southern Oquirrh Mountains and Fivemile Pass--Northern Boulder Mountains Area, Tooele and Utah Counties, Utah, 1959 _____	\$ 4.00
15 -	Geology of the Silver Island and Adjacent Areas in the Great Salt Lake Desert Northeast of Wendover, Utah, 1960 _____	\$ 4.00
16 -	Geology of the Bingham Mining District and Northern Oquirrh Mountains, 1961 _____	\$ 6.00

Intermountain Assoc. Petroleum Geologists -- Guidebooks

1951 -	Geology of the Canyon, House, and Confusion Ranges, Millard County, Utah _____	\$ 4.00
1952 -	Cedar City, Utah to Las Vegas, Nevada _____	\$ 4.00
1953 -	Geology of Northern Utah and Southeastern Idaho _____	\$ 7.50
1954 -	Geology of the High Plateaus, Central and South Central Utah _____	\$ 7.50
1955 -	Geology of Northwest Colorado _____	\$ 7.50
1956 -	Geology and Economic Deposits of East-Central Utah _____	\$ 7.50
1957 -	Guidebook to the Geology of the Uinta Basin _____	\$ 7.50
1958 -	Guidebook to the Geology of the Paradox Basin _____	\$11.00
1959 -	Guidebook to the Geology of the Wasatch and Uinta Mountains Transition Area _____	\$12.00
1960 -	Guidebook to the Geology of East Central Nevada _____	\$12.00
1961 -	Oil and Gas Fields of Utah--Symposium _____	\$10.00

*Have you used the Utah Geological Survey's
Library of Samples for Geologic Research?*



Housed in the basement of the School of Mines, at the
University of Utah

Quaternary and Tertiary Information Available

*Information is as near as the telephone —
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