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CONTENTS.

	Page.
INTRODUCTION.....	9
personal word.....	9
history and scope of investigation.....	9
acknowledgments.....	10
suggestions to travelers.....	11
I. Geography.....	13
location and extent of the reservations.....	13
note on the map.....	14
historical sketch.....	15
topographic outline.....	21
geographic provinces.....	22
Basis of subdivision.....	22
Dutton Plateau.....	23
Chaco Plateau.....	24
Chuska Valley.....	24
Manuelito Plateau.....	26
Chuska Mountains.....	27
Nomenclature.....	27
Eastern edge.....	28
Western edge.....	28
The mountain top.....	29
Carrizo Mountain.....	30
Gothic Mesas.....	31
San Juan Valley.....	31
Black Creek Valley.....	32
Defiance Plateau.....	34
Chinle and Pueblo Colorado valleys.....	36
Hopi Buttes.....	37
Tusayan Washes.....	38
Moenkopi Plateau.....	39
Black Mesa.....	40
Kaibito Plateau.....	41
Painted Desert.....	42
Shato Plateau.....	43
Rainbow Plateau.....	44
Navajo Mountain.....	45
Segi Mesas.....	47
Monument Valley.....	48
climate.....	49
General conditions.....	49
Precipitation.....	50
Records.....	50
Geographic distribution.....	59
Variation from year to year.....	60
Seasonal distribution.....	61
Character of rainstorms.....	63
Temperature.....	63
Wind.....	67

PART I. Geography—Continued.

	Page.
Soil	68
Flora	71
General relations	71
Forests	74
Fauna	74
Mineral wealth	75
Population and industries	76
Geologic sketch	77
Literature	78
Stratigraphy	78
Pre-Cambrian (?)	78
Pennsylvanian	78
Permian (?)	78
Triassic	79
Jurassic	79
Jurassic (?)	79
Cretaceous	80
Tertiary	80
Quaternary	80
Structure	80
Geologic history	82
PART II. Surface waters	85
Streams	85
Master streams of the region	85
Through-flowing streams	87
Intermittent streams	87
Moenkopi Creek	87
Black Creek	88
Pueblo Colorado Wash	89
Chinle drainage system	89
Streams tributary to Chuska Valley	91
Additional streams	92
Drainage obstructed by dunes	92
Ephemeral streams	92
Summary table of streams	93
Factors influencing stream flow	95
Precipitation	95
Amount	95
Distribution in time	96
Variation throughout the year	96
Variation from year to year	97
Violent showers of short duration	97
Evaporation	97
Soil	98
Vegetation	99
Erosion of the valley fill	100
Work of the wind	100
Fluctuation in stream volume	101
Utilization of streams	102
Nature of the problems to be studied	102
Flood irrigation	103
Irrigation by diversion	105
Area irrigated	105
Projects developed by white men	105
Projects awaiting development	106

PART II. Surface waters—Continued.**Utilization of streams—Continued.**

Page.

Irrigation by storage..... 107

General conditions..... 107

Government projects..... 109

Red Lake..... 109

Reservoir Canyon..... 109

Wheatfields reservoir..... 109

Ganado reservoir..... 110

Projects awaiting development..... 111

Leupp reservoir..... 111

Additional prospects..... 112

Quartzite Canyon..... 112

Buell Park..... 112

Lokasakad..... 112

Marsh Pass region..... 112

Segihatsosi..... 112

Miscellaneous..... 113

Storage of surface water for stock..... 113

Essential conditions..... 113

Small reservoirs or tanks..... 114

Sites..... 114

Dams..... 114

Wasteways..... 116

Water power..... 116

Lakes..... 116

Lakes of the Chuska Mountains..... 116

Tolani lakes..... 117

Lakes formed by drifting sand..... 117

Ephemeral lakes..... 118

Other lakes..... 118

Utilization of lakes..... 118

Water holes in the washes..... 119

Direct utilization of rainfall..... 119

General conditions..... 119

Water catches..... 120

PART III. Ground water..... 123

Source of the ground water..... 123

Ground-water reservoir..... 124

Nature of the reservoir..... 124

Capacity of the reservoir..... 125

Variation in porosity..... 125

Bedrock..... 125

Unconsolidated deposits..... 126

Method of filling the ground-water reservoir..... 126

Directly from the rainfall..... 126

Percolation from stream channels..... 127

Percolation from flood waters..... 127

Depletion of the reservoir..... 127

Processes of depletion..... 127

Evaporation from the ground..... 129

Evaporation of springs and seeps..... 129

The water table..... 129

Quality of ground water..... 131

Artesian water..... 131

PART III. Ground water—Continued.

	Page
Springs	133
Distribution and character	133
Springs in unconsolidated deposits	133
General relations	133
Methods of improvement	133
Springs between alluvium and bedrock	133
General relations	133
Method of development	133
Springs between rock strata	137
General relations	137
Springs of the Hopi Buttes province	139
Springs of Chuska Mountain	140
Methods of improvement	141
Springs within a stratum	142
Fault springs	143
Springs of the Tuba district	143
General relations	143
Origin of the springs	143
Methods of improvement	143
Spring records	147
Wells	150
General conditions	150
Wells in unconsolidated sediments	160
Character of the sediments	160
Location of wells	161
Wells along the axes of the washes	161
Wells on alluvial mesas or bench lands	162
Wells in high valleys	162
Wells in the Tusayan washes	162
Construction of wells	162
The problems	162
Dug wells	162
Driven wells	170
Drilled wells	170
Wells in bedrock	170
Artesian wells	170
Essential conditions	170
Wells in unconsolidated deposits	170
Wells in bedrock	178
Fallacies regarding artesian waters	178
Artesian areas	179
Determining factors	179
Upper Chuska Valley	180
Dutton Plateau and southern Chaco Plateau	180
Lower Chuska Valley	180
Upper Chinle Valley	180
Middle Chinle Valley	180
Middle Tyende Valley	181
Monument Valley	182
Black Mesa	182
Gothic Mesas	182
Other areas	182
Records of wells	182
PART IV. Geographic terms	182
PART V. Bibliography	190
Index	200

ILLUSTRATIONS.

	Page.
~~I.~~ Map of the Navajo country.....	In pocket.
~~II.~~ Map of the geology of the Navajo country.....	In pocket.
~~III.~~ A, Bennett Peak and vicinity; typical view in middle Chuska Valley; B, Shiprock and vicinity, typical view in lower Chuska Valley.....	26
~~IV.~~ Crest of Washington Pass, Chuska Mountains; looking east.....	27
~~V.~~ Carrizo Mountain from the east.....	30
~~VI.~~ A, San Juan Valley at Shiprock; B, San Juan Canyon 3 miles below Goodridge, Utah.....	31
~~VII.~~ San Juan Valley at Bluff, Utah, looking south.....	32
~~VIII.~~ A, Defiance monocline at head of lower Black Creek canyon; B, Red Lake, Black Creek Valley, looking southeast toward Zilditloi Mountain.....	33
~~IX.~~ A, North wall of Canyon de Chelly between Canyon del Muerto and Monument Canyon; B, Cliff house in Canyon de Chelly at junction with Canyon del Muerto.....	36
~~X.~~ A, Pueblo Colorado Wash below Twin Mesas; B, Volcanic necks at west edge of Hopi Buttes, on Chandler's ranch.....	37
~~XI.~~ A, Coal Mine Canyon, at north edge of Moenkopi Plateau; B, Effects of wind erosion, Kaibito Plateau; C, Dune and wind-scoured floor, Kaibito Plateau.....	40
~~XII.~~ Grand Falls, Little Colorado River.....	41
~~XIII.~~ A, Rainbow Bridge, Bridge Canyon; B, Vegetation at Nasja (Owl) Bridge, on the north slope of Navajo Mountain.....	46
~~XIV.~~ A, Comb monocline, east of Marsh Pass; B, Keet Seel cliff ruin, in branch of Laguna Canyon.....	47
~~XV.~~ A, Mitten Butte, Monument Valley; B, Agathla, a volcanic neck, Monument Valley.....	48
~~XVI.~~ Diagram showing distribution of daily rainfall in the Navajo country.....	62
~~XVII.~~ A, Wind-swept rocks, Rainbow Plateau, north of Navajo Mountain; B, West slope of Defiance Plateau.....	68
~~XVIII.~~ A, Piute Canyon at upper crossing; B, Typical view in zone of piñon and cedar, 6,000 feet above sea level.....	69
~~XIX.~~ Forest map of Navajo Reservation.....	74
~~XX.~~ Walpi, a Hopi pueblo.....	76
~~XXI.~~ Generalized section of formations represented in the Navajo country.....	78
~~XXII.~~ Structure sections across the Navajo country.....	80
~~XXIII.~~ A, Rock covered by thin soil in forest of Defiance Plateau; B, Navajo cornfield.....	100
~~XXIV.~~ A, Laguna Canyon, showing recent trenching; B, Reservoir Canyon, Tuba, Ariz., in process of filling by wind-blown sand.....	101

PLATE ~~XXV~~ . A, Little Colorado River at Tanner Crossing after heavy showers; B, Red Lake reservoir, looking south toward outlet.....	Page. 110
~~XXVI~~ . A, Outlet of Buell Park, looking downstream; B, Springs at St. Michaels.....	111
~~XXVII~~ . Map of Tuba and vicinity showing distribution of springs....	144
~~XXVIII~~ . Stereogram illustrating the character and distribution of materials filling the larger washes of the Navajo country and favorable locations for wells.....	160
~~XXIX~~ . Sections showing conditions favorable for artesian wells....	180
FIGURE 1. Map showing location of area considered in this report.....	14
2. Diagrams showing monthly distribution of rainfall in the Navajo country.....	61
3. Diagram showing seasonal distribution of rainfall in the Navajo country.....	62
4. Map and section illustrating features of the Black Falls project.....	106
5. Map of Ganado irrigation project.....	110
6. Map of proposed irrigation works at Leupp, Ariz.....	111
7. Diagram of water catch with cistern excavated in rock.....	120
8. Diagram of water catch with cistern excavated in alluvium at base of a slope.....	121
9. Diagram of water catch constructed in rock on top of a mesa.....	122
10. Diagram showing distribution of ground water and the position of the water table.....	124
11. Diagram illustrating method of constructing a kariz.....	135
12. Diagram illustrating the conditions producing the springs in the Hopi Buttes region.....	139
13. Map of a part of the Hopi Buttes province, showing the distribution of lava and sedimentary rock with reference to the position of springs.....	140
14. Diagram illustrating the conditions producing springs on the east flank of Chuska Mountain.....	141
15. Diagram illustrating method of combining several small scattered flows from rock.....	141
16. Map of Echo Cliffs between Lyon ranch and Willow Springs, showing distribution of springs.....	145
17. Section across Kaibito Plateau, illustrating the conditions which determined the distribution of springs at Tuba.....	146
18. Sections of wells in unconsolidated deposits, Tusayan Washes.....	164
19. Section of a wash showing location of shallow dug wells.....	167
20. Diagram illustrating method of constructing a well in the mouth of a rock canyon filled with coarse alluvium.....	169
21. Section illustrating method of obtaining water from the saturated rocks and unconsolidated deposits beneath a wash....	169
22. Diagram showing method of recovering ground water from underflow in Chinle Wash.....	170
23. Homemade horsepower pump.....	172
24. Section of well in Chinle Valley.....	175
25. Sections of well in rock at Keams Canyon.....	176
26. Diagram illustrating occurrence of artesian water at St. Michaels, Ariz.....	177
27. Diagram illustrating occurrence of artesian water at Gallup, N. Mex.....	177
28. Well sections, Chaco Plateau.....	181
29. Sections of flowing wells at Bluff, Utah.....	183

CHUSKA MOUNTAINS.

NOMENCLATURE.

Along the New Mexico-Arizona boundary lies a range of mountains which extends from the mesas of Manuelito Plateau northward to Redrock Valley. Though essentially uniform in geologic structure and topographic expression, it is separated in the minds of the Navajos into a number of indefinitely outlined parts. In the earliest map of this range (Simpson, 1851) the northern portion is labeled "Sierra de Tumecha," and the part south of Washington Pass, "Sierra de Chuska." This practice was generally followed by map-makers connected with military expeditions until the publication by the United States Geological Survey of the Canyon de Chelly topographic map in 1892. On the map of that date a third division of the range—"Lukachukai"—was added to "Choiskai" and "Tunitcha." These terms were supposed to embody Navajo usage, which they do in a broad sense. The lack of topographic significance of the terms is shown by translation. Lukachukai means patches of white reeds; Tunitcha, large or much water; and Chuska, white spruce. My Navajo guides informed me that these terms refer to particular spots rather than to areas, a reasonable explanation in view of the fact that on each of the subdivisions of this continuous range spruce and reeds are to be found in several localities, and that each is about equally well supplied with both lakes and running streams.

In the introduction to an ethnologic dictionary of the Navajo language, published by the Franciscan fathers of St. Michaels, Ariz., in 1910, the northwestern end of the range is called "Lukachukai Mountains," the central part is called the "Tunicha Range," and the southeastern end the "Chuska Range." In a report on life zones and crop zones of New Mexico, Vernon Bailey¹ applies the name "Chuska Mountains" to the entire range, giving the following information in a footnote:

The name Chuska, or Choiskai, is generally applied to the southern half, and Tunicha, or Tunitcha, to the northern half of this perfectly continuous and nearly uniform range. There is certainly not room for two names, and I have used the one that seems better known and in its shorter form, which is in common use among local residents.

This use of Chuska for the entire range has been approved by the United States Geographic Board, but the subdivisions Lukachukai, Tunitcha, and Chuska are retained for purposes of description as well as for historical reasons.

¹U. S. Dept. Agr. Bur. Biol. Survey North Am. Fauna No. 35, p. 60, 1913.

EASTERN EDGE.

The eastern flank of the Chuska Mountains is an imperfectly graded slope which rises from Chuska Valley at the rate of 200 to 300 feet per mile up to the 8,000-foot contour, above which steep, frequently precipitous cliffs extend to the edges of the plateau summit. Stream channels, spaced 1 mile to 3 miles apart, gash the surficial débris and in places cut into bedrock. Many of these channels contain water in their upper courses, and a line of springs, each surrounded by a small meadow, is found near the base of the upper cliffs. The slopes are covered with piñon and juniper, with alder, willow, and aspen along the short streams, and oaks and a few magnificent yellow pines along the higher benches above 7,000 feet. Scrub oak attains sizes up to 15 inches in diameter and is plentiful enough for corrals and house timbers; pines 8 inches to 2 feet in diameter were noted.¹

The Navajos here are prosperous; they raise corn, wheat, potatoes, and garden truck, and bale hay for market by pressing it into bales in the ground and tying with yucca or willow withes. Several well-made log cabins were noted between Tohachi and Washington Pass. The Indians along the east base of the Chuska Mountains have ready access to the school and subagency at Tohachi, the Mission station at Toadlena, as well as the stores in Chuska Valley. Numerous trails, in addition to the wagon road through Washington Pass,² lead to Crystal and to Fort Defiance.

WESTERN EDGE.

Unlike the eastern border of the Chuska Mountains, their western edge presents a nearly vertical escarpment, continuous except for the mouths of numerous canyons which reach into the heart of the mountains. Another distinguishing feature is the type of drainage. Most of the streams scarring the eastern flank rise on the immediate rim and collect little water from the mountain top; those flowing west extend nearly across the mountain summit. Because of the enlarged drainage area the streams emerging from the red bounding cliff wall are perennial. Upper Black Creek, Simpson Creek

¹ Simpson (1850) mentioned pine trees 8 feet in circumference and 80 feet high.

² This pass, named by Simpson in honor of Lieut. Col. John M. Washington, governor of New Mexico and commander of the "Expedition against the Navajos" in 1849, is definitely located on Simpson's map and figured as plate 45 of the official report. The location of Washington Pass on the Canyon de Chelly topographic map of the United States Geological Survey is erroneous. The local name for this pass, "Cottonwood," is not only correct but inappropriate, because of the absence of cottonwoods at this elevation (8,500 feet).

³ Simpson Creek is proposed as the name of the stream rising in Washington Pass and flowing west to Black Lake. Capt. Simpson's expedition was the first party of whites to cross the Chuska Mountain by this route. The Navajo term (Besth-kil-chee-be, the stream running from two peaks) is considered too awkward for map use, and the name "Cottonwood" has no significance.

Whiskey Creek, Palisade Creek, Wheatfields Creek, Spruce Brook, and Lukachukai Creek are beautiful streams of water, all capable of more extended use in irrigation. Prosperous groups of Navajos live on Simpson Creek and in Todilto Park (Navajo, sounding water), on upper Black Creek, where conditions for both agriculture and stock raising are very satisfactory.

The flora along the westward-flowing streams presents a variety even greater than that found on the eastern flank of the mountains. In addition to yellow pine and spruce and fir and the ever-present piñon and juniper, oaks, aspens, birch, and willows are plentiful. Hops and briars are twined about the shrubs, and flowers grow in profusion. The Indians cultivate gardens and raise patches of corn and of wheat and have a practice of fencing choice meadow lands in which native grass is allowed to reach maturity. Except for the lack of outlook no more desirable camping spots could be found. Stores at Crystal, at Greasewood, and at Round Rock supply local needs, and fairly good wagon roads lead to Fort Defiance and to Chinle.

THE MOUNTAIN TOP.

The wall forming the upper portion of the slopes flanking the Chuska Mountains rises to an altitude of about 8,000 feet. Above this point the range spreads out as a plateau with a relief of approximately 1,000 feet. The summit plateau is developed partly in Tertiary sediments and partly in lava (Pl. IV), and erosion has produced wide grass-covered valleys above which rise small mesas and irregularly shaped buttes capped by more indurated portions of the sandstone strata. Two large areas on Chuska Mountain and one on Tunitcha Mountain present flat surfaces at 8,800 to 9,000 feet. On Chuska Mountain these elevations mark the summit. The culminating points on Tunitcha Mountain are Matthews Peak¹ (9,403 feet) and Roof Butte (9,575 feet). The highest level on Lukachukai Mountain is reached at View Point (9,430 feet). From this mesa an unobstructed view may be obtained of the gorgeous panorama of Redrock Valley, Carrizo Mountain, and the lands beyond the San Juan. The Ute, La Plata, Abajo, Henry, and Navajo mountains are clearly visible; and in the middle distance are displayed the canyoned valley of the Chinle and the red-walled Monument Valley, dominated by the towering Agathla Peak. In the immediate foreground the eye rests on 14 lakes, bordered by grass and flowers and shaded by pines and oaks. This mesa is an ideal camp spot, well supplied with water, wood, and forage.

¹ Named in memory of Dr. Washington Matthews, author of many papers on Navajo anthropology.

Beyond the heads of the canyons the top of the Chuska Mountain is imperfectly drained. The streams meander through wide grass-covered floors, and swamp-bordered lakes are common. These miniature lakes, of which 41 are mapped on Chuska Mountain alone, exceed 100 in number and constitute a remarkable feature for the altitudes in the arid southwest.

The flora covering the mountain top is prevailingly yellow pine, but oak, fir, spruce, black birch, aspen, alder, and willow are common. Raspberries and wild currants are present; and among the flowers noted are roses, Mariposa lily, geranium, bluebells, wild flax, and foxglove. Grass is abundant and of good quality—a fact which makes these mountains the goal of the Navajo herdsmen when water fails in the lower lands.

CARRIZO MOUNTAIN.

Carrizo Mountain rises, a solitary mass, above the floor of Chuska and San Juan valleys (Pl. V).¹ It is separated from its nearest neighbor, Lukachukai Mountain, by the beautiful Redrock Valley. Unlike Lukachukai and other subdivisions of the Chuska Mountains, Carrizo owes its position and form to the intrusion of igneous rock which has flexed the sedimentary strata into a dome. The top of the mountain presents a roughly flat surface at an elevation of 8,000 to 8,500 feet; other plateaus stand at 9,000 feet, and above them rise rounded peaks reaching their greatest heights at Zilbetod (9,400 feet) and Pastora Peak² (9,420 feet). The mountain sides are gashed by valleys which reach well into the body of the mass. Near their heads these valleys are bordered by nearly vertical walls; farther down the canyons are replaced by wide-floored washes. Permanent streams occupy portions of these valleys, together with springs perched high upon the mountain flanks, furnish sufficient water for the needs of the Navajo. Where the mountain is not overgrazed grass is found over the top and sides and thinly spread groves of yellow pine. Search for mineral wealth in Carrizo has resulted in failure, and the Navajo tends his sheep undisturbed by other interests. Stores at Tisnasbas, at the north of the mountain, at Biltabito, and in Redrock Valley supply the needs and, with the mission at Tisnasbas, include all the white inhabitants of the Carrizo Mountain area. Until recently Carrizo Mountain was forbidden ground to the whites, but no obstacles are now placed in the way of scientists whose mission is understood by the Navajos.

¹ The Navajo name for Carrizo Mountain is the picturesque term *Dzil naosli*, "mountain surrounded by mountains."

² Named by W. H. Holmes in 1875.