# Early Naturalists of The Black Range

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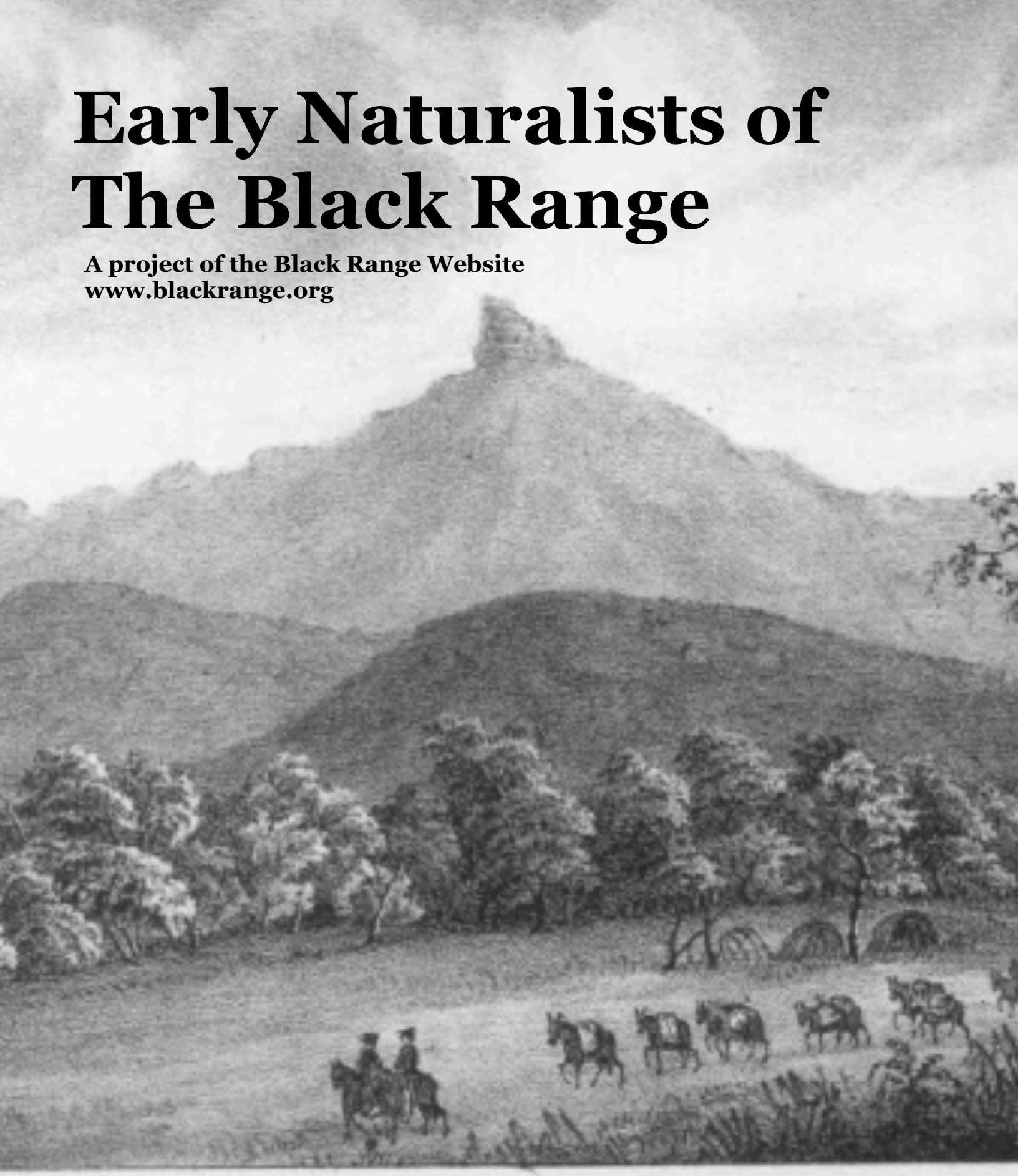
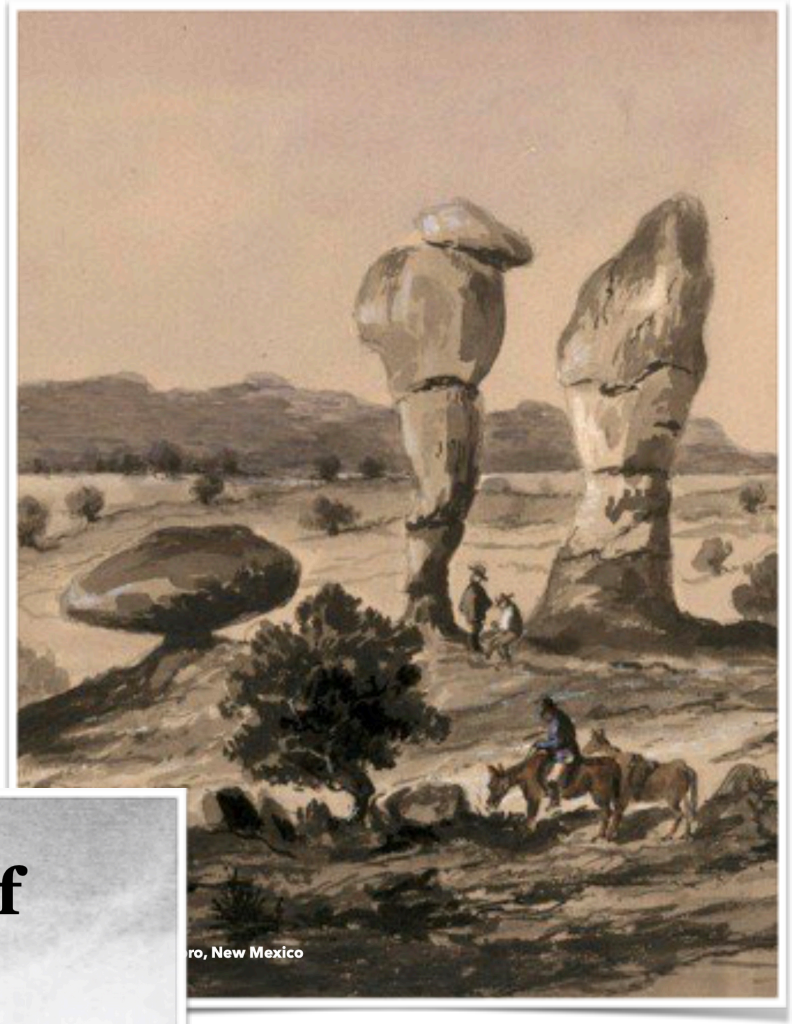


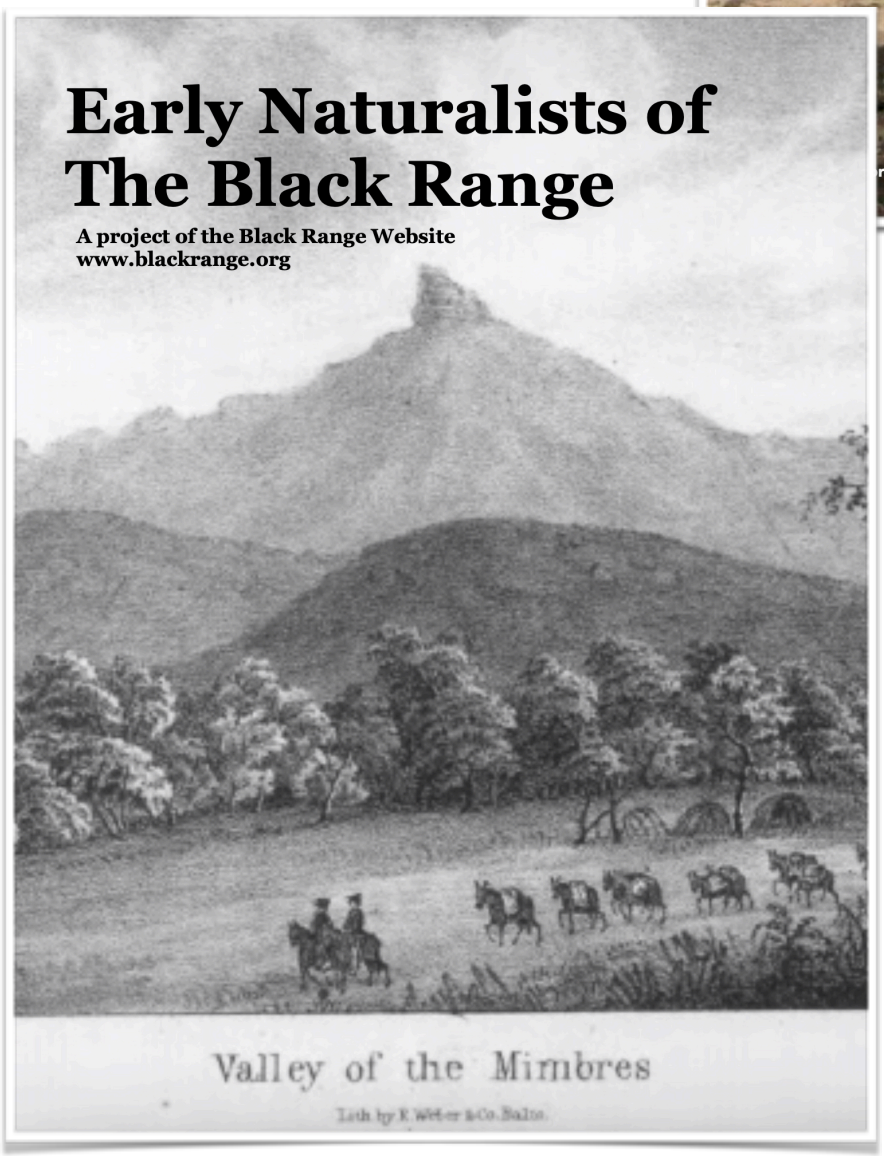
Valley of the Mimbres

Lith. by F. Weber & Co. Balto.

# The Covers




**Front Cover:** ***"Notes of a military reconnoissance, from Fort Leavenworth, in Missouri, to San Diego, in California, including parts of the Arkansas, Del Norte, and Gila rivers"*.**




**Back Cover: A detail of an original drawing which was featured in *Personal Narrative of Explorations and Incidents in Texas, New Mexico, California, Sonora, and Chihuahua, Connected With the United States and Mexican Boundary Commission During the Years 1850, '51, '52, and '53.* John Russell Bartlett.**

**This work would not have been possible without the aid of Rebecca Hallgarth.**

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# The Contents

**"Early Naturalists of the Black Range" is a survey of the people who added to our understanding of the natural history of the Black Range of Southwestern New Mexico. I do not claim that it is comprehensive or definitive. There is much which is not included, individuals and concepts. As such, and assuming that there may be a second edition, please send me your thoughts about errors of commission or omission.**

**Many of the individuals who are listed in this work went on to accomplish much more, this survey does not dwell on their work or accomplishments after they left the Black Range, we will leave that to their biographers.**

**Entries are made in rough chronological order, generally at about the start date of the individual's work in the Black Range. Their activities in the Black Range may have spanned decades or weeks and it may have been disjunct, separated by years of work elsewhere. Except for Emory, naturalists are listed only once - at the beginning of their work here on a sky island (or is it a sky peninsula?) of the Southwest.**

**Bob Barnes, Hillsboro**
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# Early Naturalists of the Black Range

Although there is yet much to be learned about the natural history of the Black Range, there is much which is known. What is known is handed down to us from many of the early naturalists and explorers, some who simply passed through or by, some who spent some time here. Some are famous, some are forgotten. What follows is a brief (and incomplete) history of some of them and their efforts up through 1930. There has been a lot of study and work done in the Black Range after 1930 - but you have to stop somewhere.

We know little about the knowledge of natural history developed by the First Peoples of this region. We have a partial record of how they related to and utilized the natural world, but little else. In one sense this, our knowledge, of their knowledge, is derived from our interpretation of their art, our study of their structures and implements, and our study of their bones and the bones of what they ate. We surmise, and we may be right. But the farther we wander from the basic facts, the more it is little more than surmise. The filter of "our" knowledge/perception creates a real impediment to our understanding of their lives. Much of what they knew about the natural world has been passed on to us, however, taught from one generation to the next. We may not recognize some of these early teachings when we look around today - but they are there, just unattributed.

The Spanish who entered this area in the 1500's were explorers, conquerers, and settlers, but generally not naturalists. (See our later entry about the natural history studies conducted by the Spanish in North America.) It is the Spanish who contributed most of the Western understanding of the "lay of the land" of the area we call home. A lot of detail has been ferreted out since the Spanish were the premier Western power of the region, but they were the first Westerners on the scene, and they defined the major features we know today. The entries in this work recognize that distinction.

In general, the earlier the period the more latitude we have given ourselves in defining "Black Range". Many of the early Spanish explorers came near the Black Range, for instance, but probably did not enter it. Their contributions, however, formed the essential bedrock on which other, more detailed studies in the Black Range rest.

Following the Spanish, other Europeans entered the area, mostly from the east. Typically they were French, British, and later American. Like the Spanish before them, most of these Westerners came to exploit and conquer. But the naturalists tended to tag along, and a more rigorous study of the natural history of this region began.

Many of the naturalists who visited this area in the 1800's were affiliated with various expeditions and surveys, which were led by people like Emory and Whipple. In the British Empire of the





late 1700's and early 1800's Joseph Banks was the person who pulled the strings when it came to the study of natural history in the British Empire. In the United States during the 1800's, Spencer Fullerton Baird played that role. Many of the naturalists associated with the expeditions and surveys were part of his "network".

Following the major expeditions, a good deal of the "natural history work" done in New Mexico was performed by the Biological Survey of the U. S. Department of Agriculture and by various universities.

This is a general survey; it does not pretend to be comprehensive. Indeed, what may characterize it more than anything else is what is not here. Absent access to hard copy records at the Smithsonian and Library of Congress, obtaining information about the work which might have been done in the Black Range of New Mexico is difficult, especially for the early periods.

## The Mimbres

Like many of the people who live in, or visit, the Black Range, the Mimbres people (and the other Mogollon people) took an interest in the natural world. It is fair to say that their interest was more of a gut thing than many of us have today. For whatever purpose, however, the natural world was recognized in much of their art. It is not uncommon to find rock carvings in the Black Range which are easily recognized to species (preceding page), and much of what has made Mimbres pottery so valued by collectors is the depiction of the animal life of the area, whether it be human or non-human. Volume 3, Number 1 (January 2020) of the *Black Range Naturalist* focused on the natural world as seen through Mimbres eyes.

Native Americans had worked the mine now known as Santa Rita since about CE 900. Artifacts of copper from this mine were

found at Etowah, Georgia, which was a Native American city from about 880 to 1550 (*Cooke's Peak - Pasaron Por Aqui - A Focus on United States History in Southwestern New Mexico*, by Donald Howard Couchman, 1990, Cultural Resources Bulletin No. 7 of the United States Bureau of Land Management, p. 21.) This book is the best general history of this area.

## Edward Palmer and J. S. Newberry (Examples of Natural History Known to the Indigenous Peoples)

Edward Palmer did little, if any, work in our area. He is one of the major contributors to our knowledge of the botany of the Southwest, however. He has more than 200 species named after him, discovered close to 1,200 new species, and collected more than 100,000 specimens. But it is not for these accomplishments that he is recognized here.

The field of ethnobotany is probably the major source of our knowledge about what the indigenous peoples knew about the natural history of the area in which they lived. Palmer is generally considered to be one of the founders of this field. His summaries of how the indigenous peoples used the plants of their region are informative.

In *Food Products of the North American Indians* (1871) he included food products from throughout the United States. His description of *Solanum fendleri* (now *S. stoloniferum*), shown to the right, and of Mesquite (now *Prosopis glandulosa* - the Honey Mesquite), shown on the following page, are indicative of his work (p. 409 - 411).

In 1877, *Food and Fiber Plants of the North American Indians* was published by J. S. Newberry. (The link is a reprint from The Popular Science Monthly of November 1887.)

Works like these provide some of the best documentation we have about the natural history knowledge of the First Peoples. The cited works were based (fully or for the most part) on first hand observation and discussion with the people using these foods.

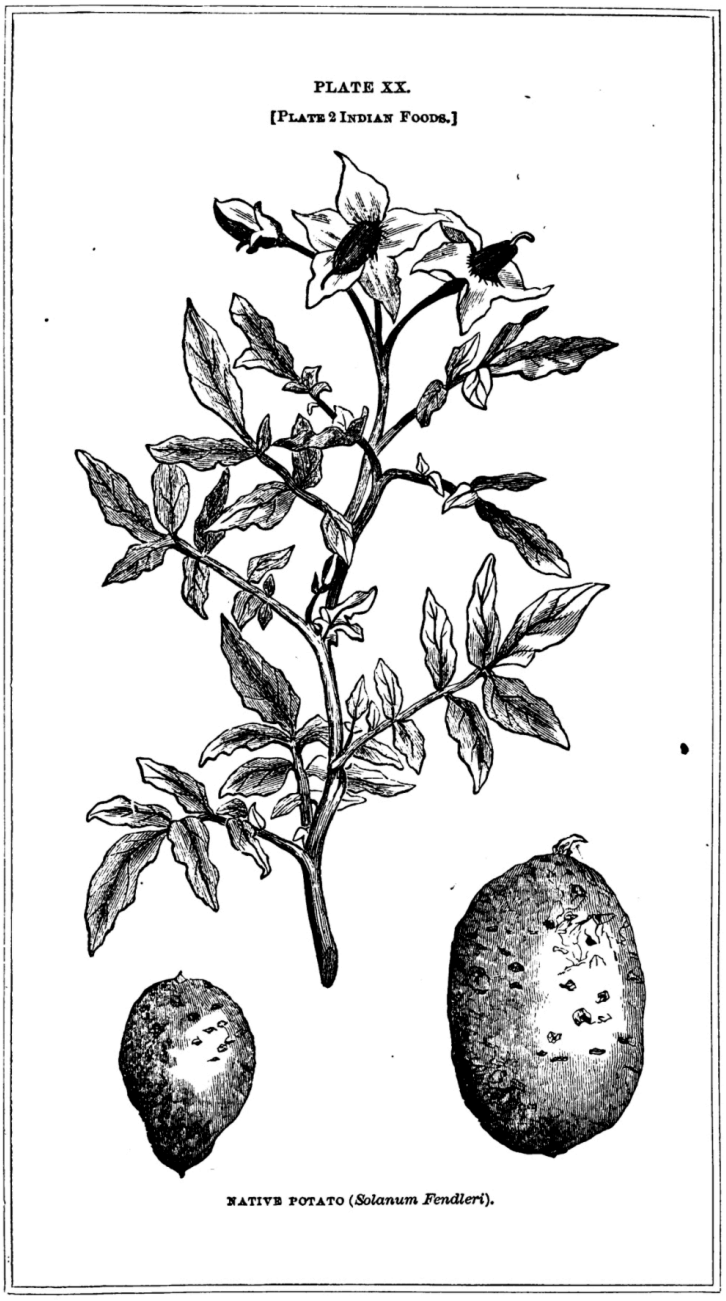


PLATE XX.

[PLATE 2 INDIAN FOODS.]

NATIVE POTATO (*Solanum Fendleri*).

*Potato*, (*Solanum Fendleri*, Plate 2).—Supposed to be the original of the cultivated potato. The writer found this plant growing in great abundance in that portion of northern New Mexico lying between Fort Wingate and Fort Defiance. The Navajo Indians inhabit this section, and this native potato forms one of their chief articles of diet in winter. The women dig the roots with whatever implements they can get, often using a strong, smooth piece of wood with a wedge-shaped end. The plant grows on low, rich spots, and by spring the earth is torn up in every conceivable direction in the search for potatoes. The tubers are quite small, one half to three-quarters of an inch in diameter, of good taste, and somewhat like a boiled chestnut. The Navajo Indians consume so large quantities at one time as to cause griping pains, and as a remedy take at the same meal a quantity of earthy matter containing magnesia, which relieves the stomach.

In 1869 a quantity of the bulbs was received by the Department of Agriculture, from New Mexico, and distributed to various parts of the continent. A few, planted in this vicinity, have largely increased in size.

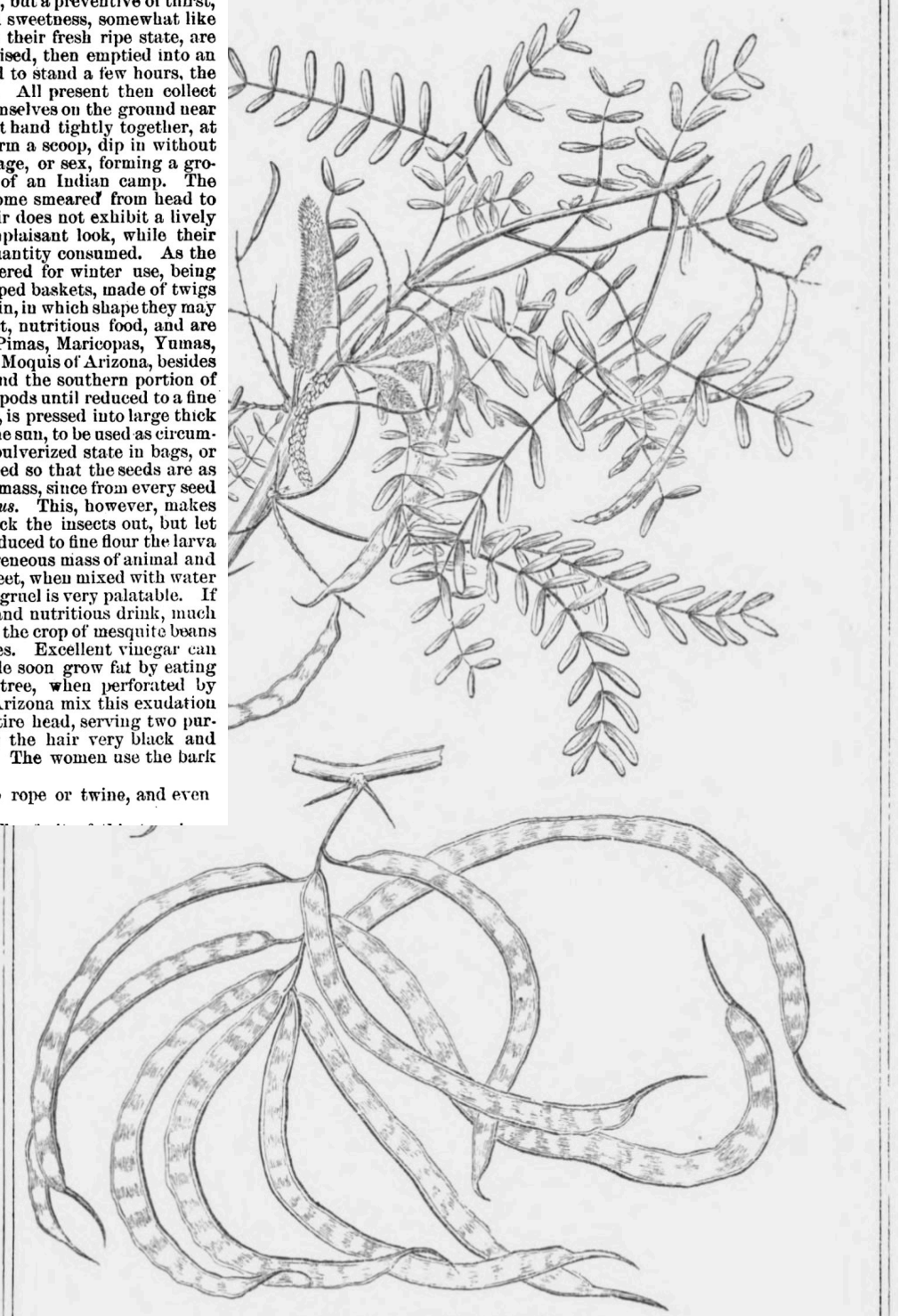
In entries for other individuals mentioned later in this book, there are often references to the observations that they were able to make. We make an effort to differentiate their direct observations from those that are based on second- or third-hand sources.

about ten bushels, which are covered with grass and earth to keep out moisture. The Apaches and Mexicans gather and consume the fruit of the dwarf oak, which grows abundantly in many parts of New Mexico and Arizona, this fruit being smaller and not so bitter as the former. Some of the species are quite sweet, and in seasons of plenty the Indians gather large quantities and sell them to the people along the Mexican frontier, and they are often to be found for sale in the stores of Arizona and New Mexico under the name of bayotis.

*Mesquite*, (*Algarobia glandulosa*, Plate 3.)—Frequently called mosqueit. The bean-like production of this common tree of the deserts is an important article of food with the Indians living within its reach. The pods are seven to nine inches long, of a buff color, ripen in June sufficiently for summer use, and travelers, both Indians and whites, chew them as they journey on. They are not only nutritious, but a preventive of thirst, having an agreeable blending of acidity and sweetness, somewhat like the early harvest apple. The pods, when in their fresh ripe state, are put into a wooden or stone mortar and bruised, then emptied into an earthen dish, mixed with water and allowed to stand a few hours, the result being a kind of cold porridge or mush. All present then collect around the newly-prepared mess, seating themselves on the ground near the dish, and, pressing the fingers of the right hand tightly together, at the same time bending the hand so as to form a scoop, dip in without ceremony, and without distinction of rank, age, or sex, forming a grotesque sight rarely to be witnessed outside of an Indian camp. The nearly naked bodies of the Indians soon become smeared from head to foot, and the shaggy appearance of their hair does not exhibit a lively sense of cleanliness. Each face wears a complaisant look, while their tumid abdomens afford certain proof of the quantity consumed. As the fruit or bean-like pods ripen they are gathered for winter use, being thoroughly dried and stored in cylindrical-shaped baskets, made of twigs and covered with grass and earth to keep out rain, in which shape they may be preserved a long time. They form a sweet, nutritious food, and are among the great luxuries of the Apaches, Pimas, Maricopas, Yumas, Yavapais, Mohaves, Hualipais, Cocopahs, and Moquis of Arizona, besides many tribes in New Mexico, Utah, Nevada, and the southern portion of California. The Indian women pound the dry pods until reduced to a fine powder, which being mixed with a little water, is pressed into large thick cakes of several pounds' weight, and dried in the sun, to be used as circumstances require. They are often kept in the pulverized state in bags, or stored as pods, but if not thoroughly pulverized so that the seeds are as fine as the pulp they will soon become a living mass, since from every seed will come forth an insect, a species of *Bruchus*. This, however, makes little difference to the Indians, who do not pick the insects out, but let them become an ingredient of the bread. If reduced to fine flour the larva of the insect becomes a part, forming a homogeneous mass of animal and vegetable substance. The flour, being very sweet, when mixed with water forms an agreeable drink, and when made into gruel is very palatable. If boiled in water and fermented, a pleasant and nutritious drink, much esteemed by the Indians, is the result. When the crop of mesquite beans fails there is great suffering among the tribes. Excellent vinegar can be made from the pods, and horses and cattle soon grow fat by eating them. The gum which oozes out of this tree, when perforated by insects, is often eaten. All the Indians of Arizona mix this exudation with mud, which is then daubed over the entire head, serving two purposes—killing all the insects, and rendering the hair very black and glossy. It is in fact a very good hair-dye. The women use the bark of this tree to make skirts, and twist it into rope or twine, and even weave it into baskets.

PLATE XXI.

[PLATE 3 INDIAN FOODS.]



MESQUITE (*Algarobia glandulosa*).

**It is clear that the indigenous peoples were knowledgeable about the natural history around them. For them it was a matter of survival. Their use of plant and animal materials was often sophisticated and nuanced. Sometimes, our understanding of their knowledge fails to appreciate the nuance. Some tribes refused to eat bear, for instance: it was not all about total exploitation of the environment in which they lived. There are a number of excellent books on ethnobotany (as an example) on which we can draw to understand how the indigenous peoples melded culture and the natural environment.**

Some caution should be exercised in this area. Some of the more "popular" new works may be somewhat suspect, and if you would like to apply the native knowledges referenced, you may wish to verify that information from multiple sources.

## Early Spanish Explorations

The early Spanish explorers had a utilitarian approach to natural history. The search for riches and their attempts to spread their religion were the major motivations for their travels. A good part of natural history is about figuring out the geography, however, and they had a lot of that to accomplish.

## Álvar Nuñez Cabeza de Vaca

1535: Cabeza de Vaca was part of the ill-fated Panfilo de Narváez expedition to Florida. After many adventures (most of which no one would want to have) he ended up in Mexico. Perhaps, he crossed the Black Range on that journey, probably in 1535 or 1536. He described pinyon and another pine growing in the region. (*Cabeza de Vaca's adventures in the unknown interior of America*, Cyclone Covey, translator and editor, 1983, University of New Mexico Press, Albuquerque, N.M.)

It is possible that Cabeza de Vaca heard about the copper mines at Santa Rita. Buckingham Smith's translation of the description of the trip (*The Narrative of Álvar Nuñez Cabeza de Vaca; Translated by Buckingham Smith*, 1851) includes this bit of insight: "Among the articles that were given to us, Andrés Dorantes received a bell of copper, thick and large, figured with a face, which they had shown, greatly prizing it. They told him that they had gotten it from others, their neighbors; and we asking them whence these had obtained it, they said that it had been brought from the direction of the north, where there was much copper, and that it was highly esteemed. We concluded that whencesoever it came there was a foundery (sic), and that work was done in hollow form." (p. 92)

The original description of the journey was published in 1542 as "*La relacion que dio Aluar Nuñez Cabeça de Vaca de lo acaescido en las Indias en la armada donde yua por Gouernador Páphilo de Narbáez desde el año de veynte y siete hasta el año de treynta y seys ...*" Smith's translation was from the second edition, which was published in 1555.

## Francisco Vásquez de Coronado

1540-1542. The account of Coronado's travels was written by Pedro Reyes Castañeda. There have been various translations and interpretations of his work. "The term 'pino' was used by the chronicler of the expedition when describing the trees observed. Reference was made to 'pillars of pine', which may have been ponderosa pine, that were used by the Pueblo Indians to construct footbridges. Extensive montane pine forests in the region were mentioned by Coronado, as they were by several subsequent Spanish explorers in the late 1500s." (Clevy Lloyd Strout, 1971. "Flora and fauna mentioned in the journals of the Coronado Expedition", *Great Plains Journal II* (1): 5-40.)

## Diego Gutierrez

1562. A detail of Gutierrez' map entitled "America, or a New Fourth Part of the World With Exact Description" (*Americae sive quartae orbis partis nova et exactissima descriptio*) is shown below. Its inexactness has led to many interpretations of what it was intended to show. The two Gulfs (California and Mexico) and the general land masses are shown quite accurately. A river is shown flowing into the Gulf of California. This is probably the Colorado River. Also flowing into the Gulf of California is the *R. de S. Paulo,* which some have posited is the Rio Grande, but it may be the Gila River. The inability of early explorers to determine their exact whereabouts plagued explorers until well into the mid 1800's. Following that time the degree of error decreased, but as professed accuracy increased, our desire to know the "exact location" also increased.



## Francisco de Ibarra

**1565. Ibarra traveled from Sonora to as far north as *Paquimé*, which he found in ruins. Although there is continual conjecture that he travelled farther north, Mecham's study of the record indicates that Ibarra turned around at *Paquimé*, most of his men not wishing to travel farther. (*Francisco de Ibarra and the Founding of Nueva Vizcaya, 1554 - 1575*, John Lloyd Mecham, 1922, Doctoral Thesis at the University of California, pp. 171-174)**

## Francisco Sánchez ("El Chamuscado") and Fray Agustín Rodríguez

**1581-1582. This expedition travelled north from Chihuahua and then up the Rio Grande to the Pueblos in the north. The first pueblo they encountered was just south of Socorro. There is no evidence that they deviated from the river route or record of any natural history activities.**

## Antonio de Espejo

**1582-1583. Espejo's group travelled north from Chihuahua to the Pueblos along the same route as Sánchez and Rodríguez. He explored away from the river to a greater extent than previous explorers (into Arizona and back to the Pueblos and then south along the Pecos River). Again, this was a group searching for wealth rather than knowledge of the natural world.**

**Please see *Volume XXIV of the Southern New Mexico Historical Review, January 2017*, Doña Ana County Historical Society, "La Ruta de Oñate: Early Parages of Northern Chihuahua and Southern New Mexico Along the Camino Real de Tierra Adentro" by Joseph P. Sanchez, pp. 11-23 for an excellent physical and historical description of the route up the Rio Grande de Norte.**

## Gaspar Castaño de Sosa

**1590. De Sosa attempted to (illegally) settle New Mexico in 1590. He left Saltillo, Coahuila, with about 200 settlers. Juan Morlete was sent north to arrest him in 1592. De Sosa was captured and forced to serve on the Spanish Galleons in the Philippines.**

## Don Juan de Oñate

**1598. The expedition led by Oñate passed modern day Hatch (naming a pass in the area Sombre Robledo after Pedro Robledo, who died in the area) on their way north to found the first capital of New Mexico, San Juan de los Caballeros. Many of the place names along the Camino Real de Tierra Adentro were given at later dates, so Oñate did not travel up the Jornada del Muerto; he traveled up the route which was later given that name.**

## Nicholas Sanson

**1650. Sanson's map (*Amerique Septentrionale, La Nouveau Mexique et La Florida* - detail below) still had the Rio de Norte flowing into the Gulf of California but represented a major step forward in understanding the geography of the area.**




*Nicholas Sanson's map*

## Vincenzo Maria Coronelli

**1688. Coronelli's map, *America Settentrionale*, see detail right, has the Rio de Norte flowing into the Gulf of Mexico, but there is no apparent sign of the Rio Gila.**




*Coronelli's map*

**Although significant errors persist (Taos is placed very far south, for instance - south of Socorro, and California is still an island) this map represents a major step forward.**

## Father Eusebio Francisco Kino

**1695. There are reports that he followed the Gila River to its headwaters, he may have only followed it to Casa Grande.**

## Juan M. Menchero

**1747. Fr. Menchero turned west from the Jornada del Muerto and travelled into the Gila, then north to Acoma.**

## Bernardo de Miera y Pacheco

**1758. Bernardo de Miera y Pacheco was one of the most important cartographers in New Spain (if not the most important) during this era. By 1743 he had settled in El Paso but moved to Santa Fe in 1754.**

**His map "*Map which Don Francisco Antonio Marín del Valle, Governor and Captain General of this kingdom of New Mexico, ordered drawn*" was widely used during the colonial period and is shown below. Note the following in the detail: The existence of the Sierra del Cobre Virgen north east of the Sierra Florida and the Rio de las Mimbres between the two. (The Rio Mimbres is shown flowing into a lake.) North of the Sierra Florida is Cerro de las Remedies, which refers to what is now known as Cooke's Peak. (*Cooke's Peak - Pasaron Por Aqui - A Focus on United States History in Southwestern New Mexico*, p. 19. )**

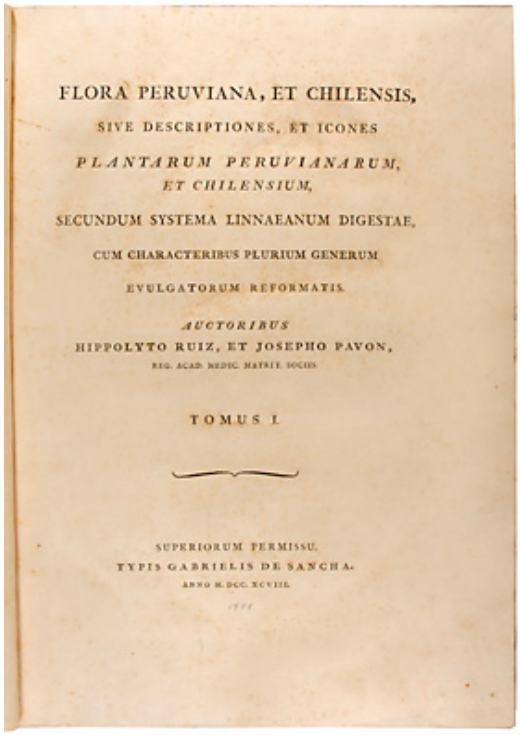



Map of Bernardo de Miera y Pacheco

## Spanish Naturalists

**We sometimes fall into the trap of believing that the Spanish, especially those who explored and conquered the Americas, were not naturalists; that the British, and less so Germans and French, were the naturalists of the early European explorations. That is not the case. The Spanish incursions in this area were similar to those of the French, British, and American. For the most part, the early travels into this area were about exploitation, conquering, and settling. It is, generally, only after those basic inclinations were met that the study of the natural world began in earnest. Most of the study here did not begin until the mid 1800's.**

**In many areas, the Spanish carried out extensive studies in natural history. For instance, the botanists Hipólito Ruiz López and José Antonio Pavón Jiménez, referred to as "Ruiz & Pav" in botanical literature, published the five volume *Flora Peruviana, et Chilensis, sive, Descriptiones et icones plantarum Peruvianarum, et Chilensium, secundum systema Linnaeanum digestae, cum characteribus plurium generum evulgatorum reformatis* between**


FLORA PERUVIANA, ET CHILENSIS,

SIVE DESCRIPTIONES, ET ICONES

*PLANTARUM PERUVIANARUM, ET CHILENSIUM,*

SECUNDUM SYSTEMA LINNAEANUM DIGESTAE,

CUM CHARACTERIBUS PLURIUM GENERUM

EVULGATORUM REFORMATIS.

*AUCTORIBUS*

HIPPOLYTO RUIZ, ET JOSEPHO PAVON,

REG. ACAD. MEDIC. MATRIT. SOCIIS.

TOMUS I.

SUPERIORUM PERMISSU.

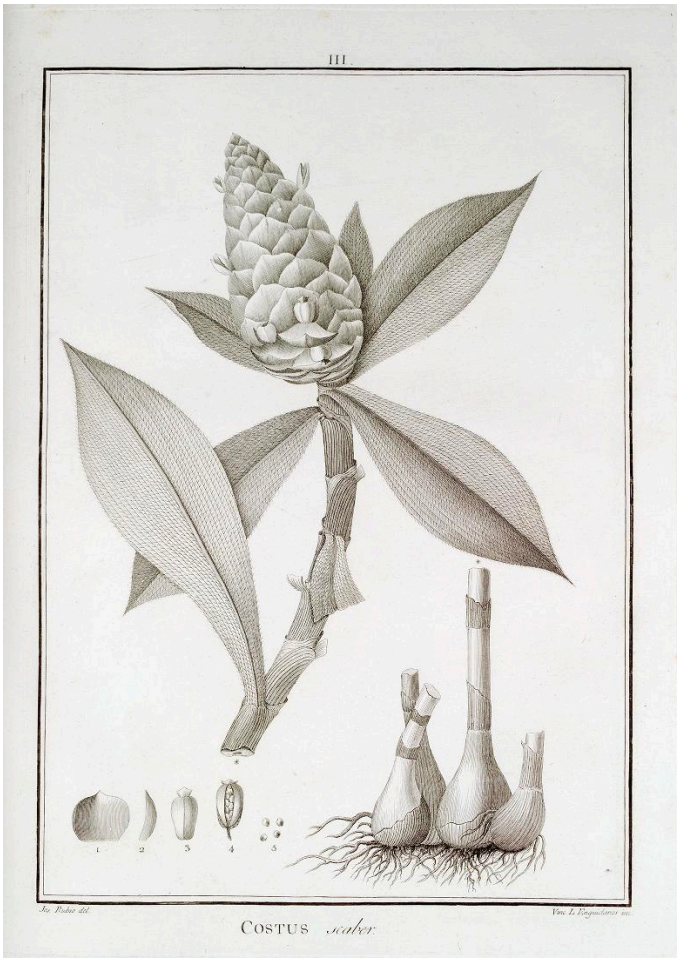
TYPIS GABRIELIS DE SANCHA.

ANNO M.DCC.XCVIII.

**1798 and 1802. That work (which includes 325 plates) describes the flora of Peru and Chile. A plate from that work is shown above right.**

**At about the same time, Antonio José Cavanilles, a Spanish taxonomic botanist (Cav. in botanical literature) was naming more than 100 genera and describing more than 2200 plant species for the first time. Fifty-four of those genera descriptions are still used today.**

**The efforts of these men followed those of Martín de Sessé, José Mariano Mociño, and others associated with the Royal Botanical Expedition to New Spain (1787 to 1803). This expedition was designed as a series of "excursions", each focused on a different**




**area. These efforts led to the description of 797 genera and 1327 species. The work was not limited to botany, but rather encompassed the full range of natural history. The expedition was so successful that additional expeditions, to Central America and the Caribbean, followed.**




**And, of course, the first scientific expedition in the Americas was conducted by Francisco Hernández between 1572-1577. The focus of his efforts was the botany of Mexico and Central America.**

## José Ramón de Urrutia y las Casas

**1771. José Ramón de Urrutia y las Casas was a cartographer during the period when he was in New Mexico and crafted several maps, including the *Primera Parte* map of 1771 which is shown on the following page.**

**As with many maps of this era, it takes a bit of orienting to understand what is being shown, because the geographic knowledge of the map-makers was imprecise. Note, however, that there is much which is right about this map. The map shows a river flowing across the top of the map, labeled as the Rio Gila, and it flows into another larger river before entering the Gulf. Turning to the detail, the headwaters of the Gila are shown originating from the Sierra de Gila, just north of the Sierra del Cobre and Sierra Florida. The Rio Grande and the San Diego crossing are shown correctly, as is the Jornada del Muerto. Laguna de Guzmán in Chihuahua is also shown.**

**Of interest to us are the rivers flowing into the Rio Grande from the west, one of which is named the S. Bernardo.**

**Paso del Rio del Norte is placed too far north. Many things seem right once it is moved farther south.**

## Juan Bautista de Anza & Don Francisco Martínez

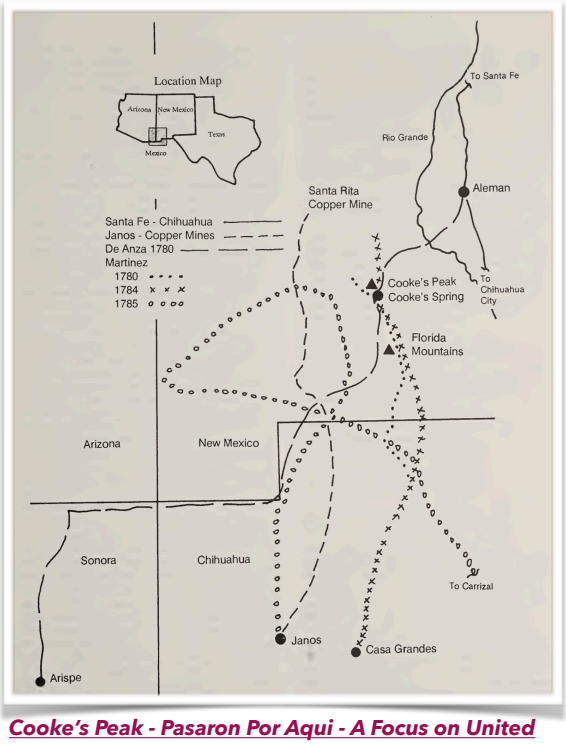
**1780. A component of the Anza expedition, led by Martínez, camped at Cooke's Spring on November 18, 1780. He called the spring "San Miguel". A few days later (November 28) Anza stopped at the spring. He called the spring "Picacho". After a stay of a few hours he crossed to the Rio Mimbres. (*Cooke's Peak - Pasaron Por Aqui - A Focus on United States History in Southwestern New Mexico*, p. 20). See right for a map of these routes and of the existing Spanish roads of the time. Martínez may have visited the current Faywood Hot Springs, which he called "*Ojo Toro*" (bull spring) in 1785.**

**In the area of the Black Range and the Mimbres, most of the Spanish activity between 1784 and 1785 was military and focused on conquest of the Apache.**

**The Apache called Cooke's Peak "Dziltanatal", which may be translated as "Mountain Holds Its Head Up Proudly" or "The Proud Mountain That Sits Alone." The Spanish first called it "Cerro de los Remedios" (Bernardo Miera y Pacheco in 1758) and later "Picacho de las Mimbres" (Jose Antonio Vildosola, 1780).**

## Don José Manuel Carrasco

**1800. Carrasco made the first claim to what he named "Santa Rita del Cobre", the location of the copper mine being revealed to him by an Apache Indian guide. (This may be questioned based on Urrutia's map of 1771 and Pacheco's map of 1758, which clearly show "Sierra del Cobre" in the area where the mine is. Either it was known that copper came from somewhere**




***Cooke's Peak - Pasaron Por Aqui - A Focus on United States History in Southwestern New Mexico*, by Donald Howard Couchman, 1990 - Cultural Resources Bulletin No. 7 of the United States Bureau of Land Management, p. 15.**

**in the mountains here or the location of the mine was known prior to 1800.)**

## Don Francisco Manuel de Elguea

**In 1804, Carrasco sold his rights to the Santa Rita mine to Elguea, who built a fort at the site and "employed" 600 miners. In 1809 his heirs leased the mine to Juan Onis who, in turn, leased it to Sylvester and James Pattie in 1825. By 1827 the Patties had left for California, and Estevan Courcier profitably operated the mine until 1834. From 1834 to 1837 Robert**



**Remains of one of the round towers of the triangular fort erected by Francisco Manuel Elguea. Photo ca. 1911.**

**McKnight operated the mine. The mine operators were not necessarily naturalists, but the mine became the "center of operations" for most of the naturalist endeavors well into the 1860's.**




Urrutia's Map



## The Humboldt Map of 1804

**1804: The map is named after Alexander von Humboldt because he was a contributor of information.**

**"This map is said to represent the dawn of the modern era of the scientific understanding of physical geography. It depicts the convoluted topography that reveals the Southwest to be straddling a backbone of two major mountain ranges and drained by a confusing network of rivers and intermittent streams. Subsequent scientific observation reaffirmed that the area was divided longitudinally into a series of ridges and valleys. This is not to say that Humboldt's map was correct, for it contains a number of significant errors. On Humboldt's map, even rivers that today we know have more transverse courses seem to be constricted horizontally because of the cartographic inability to determine longitude effectively.**

**Despite certain errors, however, Humboldt's map reminds us of a basic fact of the region's geography, namely, that it is easier to traverse along north-south than east-west lines. This helps to explain the pattern of settlement in the Southwest for much of its history. Even under Spanish rule the area was compartmentalized along north-south axes, such as the Rio Grande in New Mexico and the Santa Cruz and San Pedro River valleys in Arizona. The topography also helps to explain the difficulty that rational people have in drawing lines around the region: there are no such physiographic borders in the landscape."***

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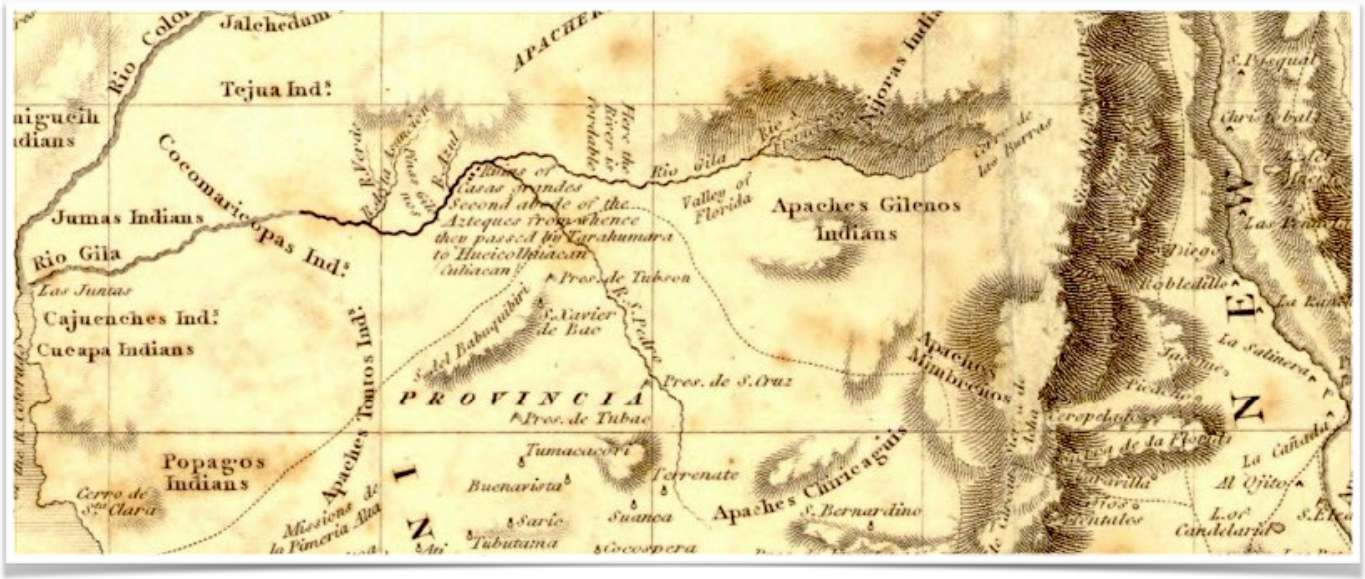
***Richard Francaviglia, "Elusive Land: Changing Geographic Images of the Southwest", *Essays on The Changing Images of the Southwest*, edited by Francaviglia and Narrett, University of Texas at Arlington.**

## WHAT ELSE WAS HAPPENING IN 1804?

- Haiti gained its independence from France, becoming the first Black republic.
- New Jersey became the last of the northern states to abolish slavery.
- The Louisiana Purchase was finalized.
- The Lewis & Clark Expedition began.
- Simón Bolívar began the South American Revolt against Spain.
- John Deere, Jim Bridger, Nathaniel Hawthorne, and John Gould were born.
- Priestley (the chemist), Kant (the philosopher), and Hamilton (the politician) died.
- Jefferson was President, Burr was Vice President, Hamilton was (for a while) Secretary of the Treasury, and Marshall was the Chief Justice.

## THE LEWIS AND CLARK EXPEDITION IN 1804

- March 9, the formal transfer of the Louisiana Territory to the United States occurs.
- May 14, the expedition - dubbed the Corps of Discovery - departs their winter quarters just north of St. Louis and heads up the Missouri River.
- June 26, camp at Kaw Point about 400 miles from the start of the trip, near the confluence with the Kansas River.
- This is a military expedition; lashes are handed out for disciplinary breaches.
- July 21, at 640 miles from St. Louis, the expedition reaches the confluence with the Platt River in Nebraska.
- September 20, roughly 1300 miles from St. Louis, they reach the Big Bend of the Missouri.
- November 2, they select the site of Fort Mandan for their winter encampment, near what is now Washburn, North Dakota. Two days later they hire a French fur trader named Toussaint Charbonneau and his wife Sacagawea.




**The Alexander von Humboldt map of 1804, shown entirely on the next page and in detail above shows "The Sierra del Mimbres", the Diego crossing of the Rio Grande, the source of the Rio Gila and the Valley of Florida. It also shows the homeland of the Apaches Mimbreanos. The location of major features was maturing but not exact.**


A MAP OF
NEW SPAIN
from 16°. to 38°. North Latitude
reduced from the Large Map drawn from
astronomical observations at Mexico
in the Year 1804,
BY ALEXANDRE DE HUMBOLDT,
and comprehending the whole of the information contained in the
Original Map,
except the heights of the Mountains.
Longitude West 110 from Greenwich
Longitude West 112 from Paris
LOUISIANA
GULF OF MEXICO
GREAT EQUINOCTIAL OCEAN
(MAR DEL SUR Ó OCEANO PACIFICO)
GULF OF CALIFORNIA OR SEA OF CORTES
Vermilion Sea
Rio Bravo del Norte
EXPLANATION.
CAPITAL or large TOWN.
Less considerable Town Borough.
Village.
Seat of the provincial Council of the Mines.
Real Mine.
Hacienda Farm.
Rancho Station of Moleteros.
Presidio, Military Post.
Astronomical Observation calculated by M. Oltmanns.




## Zebulon Montgomery Pike

**1807: In March 1807, Pike traveled south along the Rio Grande from Santa Fe. On March 14, the party crossed the Rio Grande to the west side of the river (near Fra Cristobal) and travelled through the eastern environs of the Black Range until the 17th. A detail of his map (1810) of this part of his expedition is shown to the left. Note that the Santa Rita Copper Mine is shown prominently. Apparently he did not visit the mine, but his assessment of the mine (from secondary sources) was that it produced 3 to 6 million pounds of ore a year. The ore was concentrated at the mine and shipped south by mule (approximately 20,000 mule-loads per year) to Janos for processing. (*Cooke's Peak - Pasaron Por Aqui - A Focus on United States History in Southwestern New Mexico*, p. 21).**



## Edwin James

**1820: James accompanied the Stephen Harriman Long Expedition to Colorado in 1820, serving as botanist and geologist. His travels on this expedition were limited to the northeastern portion of what is now New Mexico. Included here because the Long Expedition was the first scientific survey of the region, and many of the species which can be found in our area were first recorded by members of the expedition.**

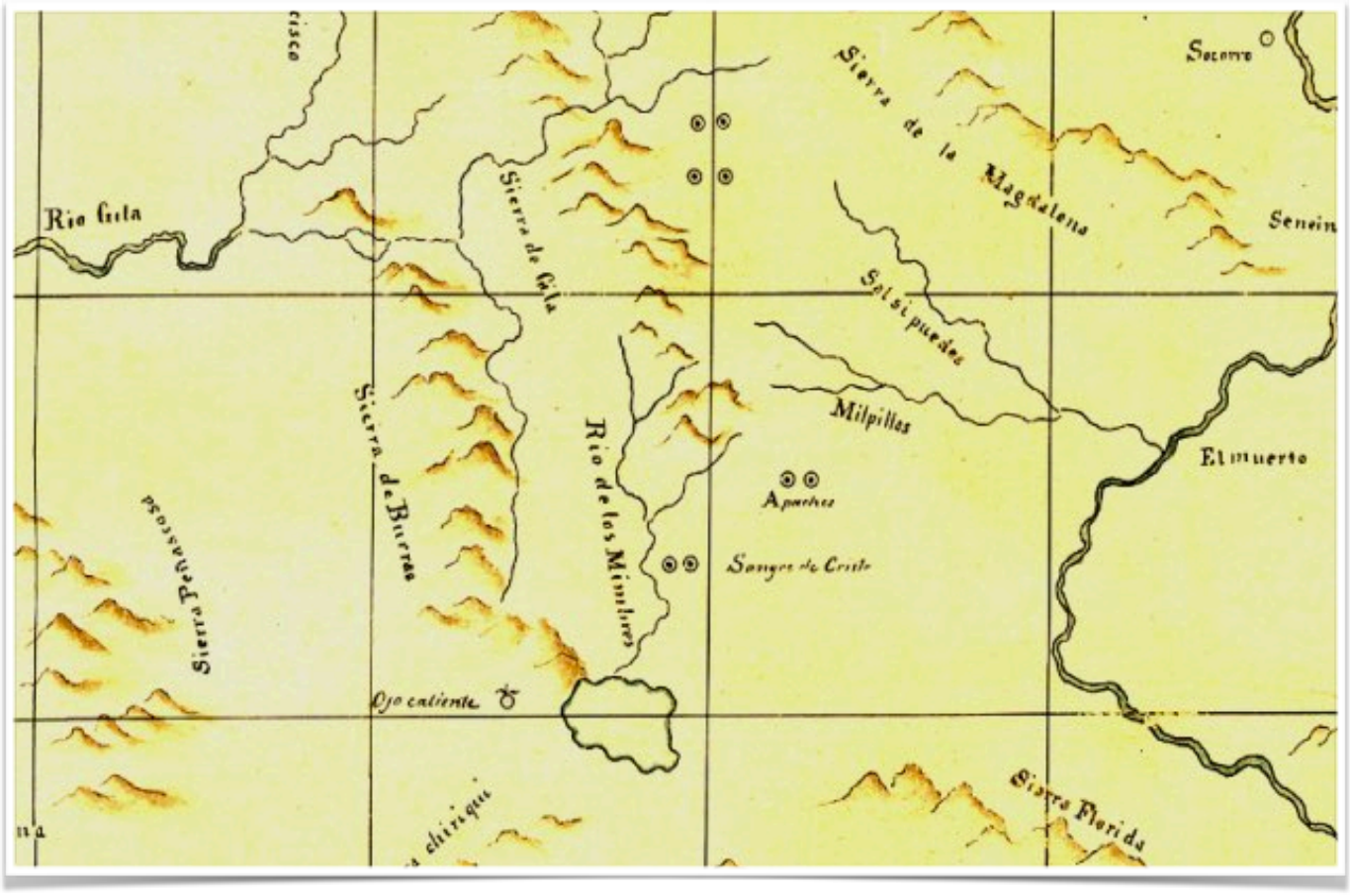



## Thomas Say

**1820: Say served as zoologist on the Long Expedition. The expedition's account records the first descriptions of Coyote, Western Kingbird, Band-tailed Pigeon, Rock Wren, Lesser Goldfinch, Lazuli Bunting, Collared Lizard, and many other species. Among those other species was Say's Phoebe, named in his honor by Charles Lucien Bonaparte.**

## José María Narváez

**1823: Had José María Narváez ' map entitled "*Carta esferica de los territorios de la alta y baja Californias y estado de Sonora*" of 1823 been available at the time the Treaty of Guadalupe Hidalgo was negotiated in 1848 and the boundary survey directed, many of the problems inherent in the survey effort would never have occurred. But it was not available. The map (shown at the right) was remarkably accurate for the time. A detail is shown below.**



## James Ohio Pattie

**In 1825, James and Sylvester Pattie, James Kirker, and Nathaniel Pryor reopened the Santa Rita mine. It was abandoned in 1838 because of increasing warfare between the Europeans and the Apaches. (*Cooke's Peak - Pasaron Por Aqui - A Focus on United States History in Southwestern New Mexico*, pp. 23-24) James Pattie apparently made trips into Mexico on mine business, probably (based on route notes) traveling via Cooke's Spring.**

***The Personal Narrative of James O. Pattie of Kentucky*, edited by Timothy Flint, was published in 1831. It may be a stretch to refer to a trapper as a naturalist, but Pattie was certainly an observer of the natural world. The description of his initial crossing of the Black Range and his first trapping expedition into the Gila starts on page 52 of that work.**

> **"On the 7th (ed: December 7, 1824) we left the del Norte, and took a direct course for the Copper mines. We next traveled from the river over a very mountainous country four days, at the expiration of which time we reached this point of our destination. We were here but one night, and I had not leisure to examine the mode, in which the copper was manufactured. In the morning we hired two Spanish servants to accompany us; and making a north-west course pursued our journey, until we reached the Helay (ed. - Gila) on the 14th. We found the country the greater part of the two last days hilly and somewhat barren with a growth of pine, live oak, pinion, cedar and some small trees, of which I did not know the name. We caught thirty beavers, the first night we encamped on this river." (p. 52)**

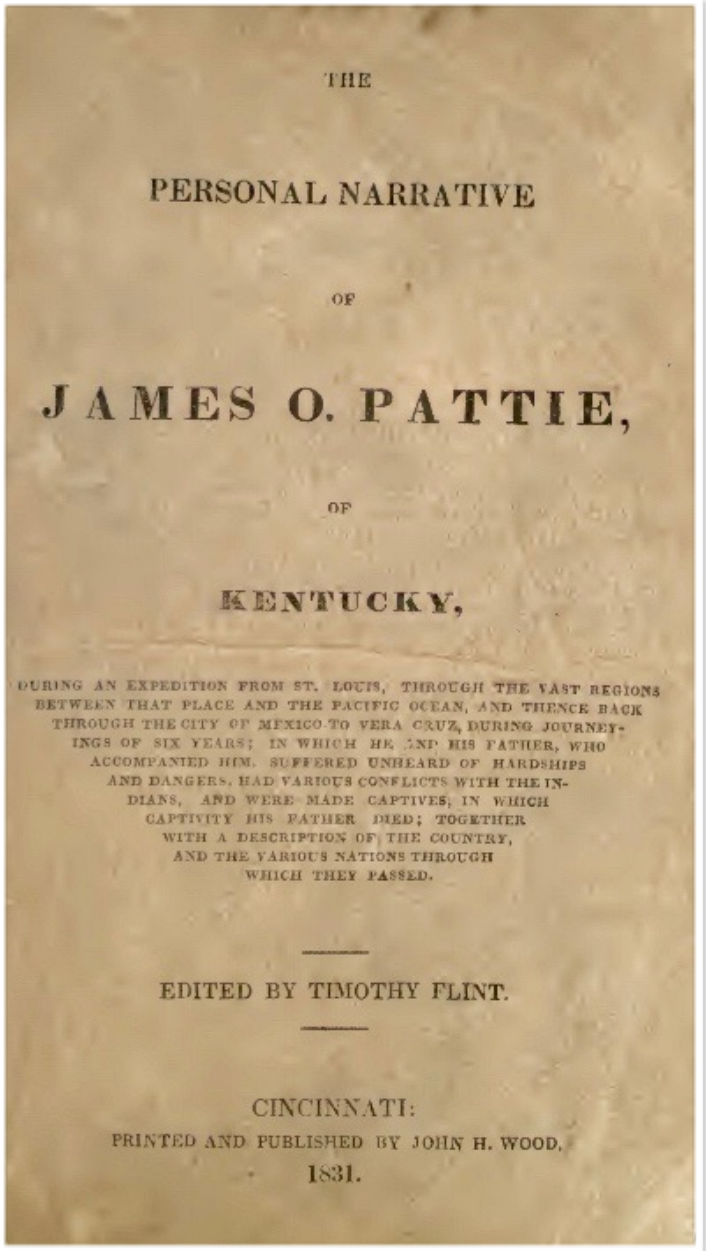
> **"On the morning of the 13th . . . crossed the river, here a beautiful clear stream about thirty yards in width, running over a rocky bottom, and filled with fish . . . compelled to cross it thirty-six times. We were obliged to scramble along under the cliffs, sometimes upon our hands and knees, through a thick tangle of grape-vines and under-brush . . . where the river forked, and encamped on the point between the forks. We found here a boiling spring so near the main stream, that the fish caught in the one might be thrown into the other without leaving the spot, where it was taken. In six minutes it would be thoroughly cooked." (p. 53)**

**The next day he set off alone and saw many bear, killed and cooked a turkey for dinner, and awoke in the night to see:**

> **"a panther stretched on the log by which I was lying, within six feet of me, I raised my gun gently to my face, and shot it in the head. Then springing to my feet, I ran about ten steps, and stopped to reload my gun, not knowing if I had killed the panther or not." (p. 54)**

**On January 2, 1825, along a river they named the St. Francisco they came came upon:**

> **"multitudes of mountain sheep. These animals are not found on level ground, being there slow of foot, but on these cliffs and rocks they are so nimble and expert in jumping from point to point, that no dog or wolf can overtake them. One of them that we killed had the largest horns, that I ever saw on animals of any description. One of them would hold a gallon of water. Their meat tastes like our mutton. Their hair is short like a deer's, though fine. The French call them the *gros cornes*, from the size of their horns which curl around their ears, like our domestic sheep. These animals are about the size of a large deer...." (p. 56)**


THE

PERSONAL NARRATIVE

OF

JAMES O. PATTIE,

OF

KENTUCKY,

DURING AN EXPEDITION FROM ST. LOUIS, THROUGH THE VAST REGIONS BETWEEN THAT PLACE AND THE PACIFIC OCEAN, AND THENCE BACK THROUGH THE CITY OF MEXICO TO VERA CRUZ, DURING JOURNEYINGS OF SIX YEARS; IN WHICH HE AND HIS FATHER, WHO ACCOMPANIED HIM, SUFFERED UNHEARD OF HARDSHIPS AND DANGERS, HAD VARIOUS CONFLICTS WITH THE INDIANS, AND WERE MADE CAPTIVES, IN WHICH CAPTIVITY HIS FATHER DIED; TOGETHER WITH A DESCRIPTION OF THE COUNTRY, AND THE VARIOUS NATIONS THROUGH WHICH THEY PASSED.

EDITED BY TIMOTHY FLINT.

CINCINNATI:
PRINTED AND PUBLISHED BY JOHN H. WOOD.
1831.

**By January 19 they had returned to the Gila, having trapped 250 beavers.**

**The Pattie narrative is replete with adventures, and it is a time when adventures were to be had. It is also full of vivid descriptions of the natural world he encountered as one of the first Northern Europeans to explore our area.**

## Henry S. Tanner Map of 1825

**The Henry S. Tanner Map of 1825 (the third edition - 1846) is shown below. It was the original source of a substantial amount of angst in the late 1840's. This was a good map for the time, but it did have its faults, and those faults led to some international disputes.**

**The 1828 map published by White, Gallaher & White was plagiarized from Tanner's 1825 map of Mexico. It is shown on the following page, including a detail from the map which shows the area of the Black Range. As a point of reference, the San Diego crossing is in the lower right corner of the map detail, and the mountain range running north and south about a quarter of the way from the right is the Sierra de los Mimbres. To the left of the Sierra de los Mimbres are the Burro Mountains, the Gila, and the San Francisco. There is also an unknown river flowing into the Gila from the south - this might be an erroneously depicted Rio Mimbres. The road from Chihuahua to Santa Fe is clearly marked as well.**

**Disturnell's map (see page 48), which caused such confusion for the United States-Mexico Boundary Survey in the late 1840's, was based on the White, Gallaher & White map.**

**The practice of plagiarizing earlier works, or simply using them as definitive sources of information, is a continuing source of irritation and litigation in modern map-making. It is not all about the past. It is not uncommon for map makers to intentionally introduce errors on their maps to make it easier to prove copyright violations. The legal effectiveness of these techniques has been drawn into question by recent rulings of the United States Supreme Court, specifically Feist v. Rural Telephone Company and Alexandria Drafting Co. v. Amsterdam.**

**The map shown below is from the David Rumsey Map Collection. The link will take you to the map overlaid on a modern map, what they call their "georeferencer", an extremely useful tool when trying to decipher exactly what early maps are showing.**

**Maps, in general, can provide a significant amount of insight into what was known of the world at a specific time. The series of maps depicted in this reference (*Early Naturalists of the Black Range*) clearly demonstrates a growing precision over the years. From that it is easy to infer, at the very least, a growing understanding of the geography, geology, and hydrology of our area.**

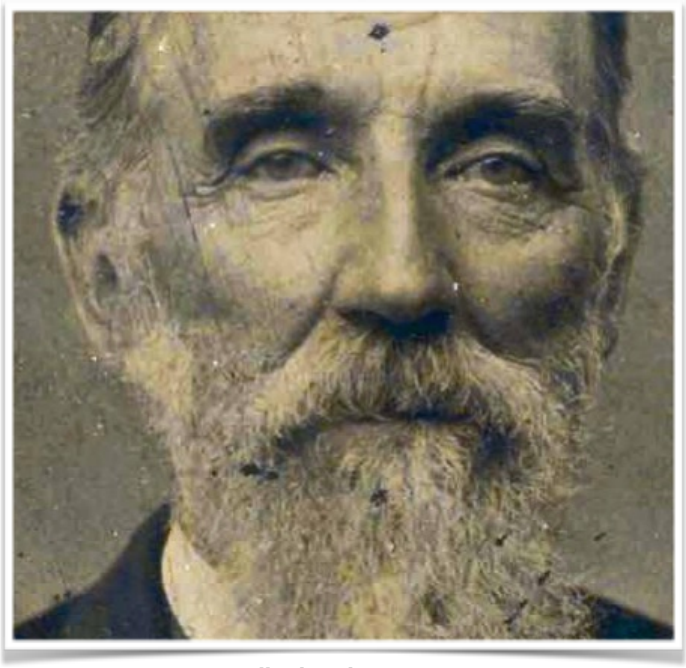



MAPA
de los
ESTADOS UNIDOS
de
MÉJICO.
GOLFO DE MÉJICO


Rio Jaquesita
Orayha
Indios Cosninas
Moqui Ind.
Jongoapi
Los Moques han conservado su independencia desde el año 1680.
Chemeguaba Indios
Yumaya Ind.
Mt. Cosninas
Los Yubipias ó Indios de bahas largas
R. S. Maria
Indios Jalchedum
APACHERIA
Chaca
Compa
Coquima
Ind. Nijoras
R. S. Francisco
Rio Gila
Pinos Gilenos
R. Verde
R. de las Asencion
R. Azul
Ruinas de las Casas 2das de los Aztecas
R. Gila
Indios Cocomaricopas
Valle de la Florida
Fte de Tubson
S. Javier de Bac
Mte Babuquiburi
Apaches Gilenos Inds.
Fte Santa Cruz
Fte Tubac
Tumacacori
Buenavista
Apas Chiricaguis
Sierra de los Mimbres
Mte Burras
Apaches Mimbres
NUEVO MÉJICO
Agua Gallo
Abicui
Vitiori
Gomez
Cia
Tonsac
Laguna Acoma
Isleta
Sabinez
Xazates
Valencia
Alemillo ó Sabineta
S. Pascual
Mte Magitia
Mina de Cobre
Cristobal
L. del Muerto
Las Penuelas
Sn Diego
Robledillo
La Ranseria
Jdcome
Picacho
La Salinera
Corepelado
Fte Paso del Norte

## Rowland Willard

**In 1825-7, Willard, who was a physician, travelled south from Taos to Chihuahua, where he practiced for two years before the Mexican government deported foreigners. He is another traveler who passed the Black Range by, staying in the valley.**



**Willard in about 1875**

**His stay in the southwest started on May 6, 1825, when he joined a trading caravan, heading for New Mexico, in St. Charles, Missouri.**

**An account of his travels was published to great interest. "Inland Trade With New Mexico" was published as an addendum to *The Personal Narrative of James O. Pattie of Kentucky*, edited by Timothy Flint, which was published in 1831. This summary by the editors contains a significant amount of information. His journal has also been transcribed and printed.**

**At page 267-8, a summary of Willard's description of the weather, of caliche, and of the Rio del Norte is given. Willard reported that he had been told that "In 1752 the Rio del Norte became dry for an extent of 150 leagues. The water had sunk, and passed through subterranean channels, and so continued to flow for some weeks; when, no doubt, the chasm became choked, and the river resumed its former bed." A league is roughly three miles, so he was reporting that the Rio Grande was dry for 450 miles in 1752. "It seldom rains; and when rains happen, the spring of that country may be said to have commenced. The naked, red and rolling surface of the wide prairies, only limited by rude and rugged mountains, become at once covered with a tender and deep verdure. This spring happens in September."**

**In Chihuahua, Willard found that most of the "houses in the towns are generally built of unburnt bricks (ed. adobe); in many instances in the form of a parallelogram, or hollow square, making the front at once mural defences, and the fronts of dwellings. The floors are, for the most part, brick or composition, - that is to say, clay, lime &c. pulverized, and cemented with blood, or other glutinous and sizy liquids." (pp. 269-270) These are the same types of structures that many naturalists were to find and live in throughout the 1800's.**

**The work is a product of its time. The descriptions of peoples, and their cultures, other than that of the author's, is often dismissive and biased to an extent that it prevents a clear understanding of the subject. But it is possible, if you take out the adjectives, to gain some real insight into the lives of these people and the land in which they lived.**



**Willard's scarificator, used for bloodletting as part of the medical treatment he administered in the 1820's.**

## Fur Trappers

**Throughout this period, fur trappers like Pauline Weaver were actively trapping along the Gila River. Trappers like Pattie and travelers like Willard and Gregg (see next page) were not "one off". Although sparse by today's standards, there were a great many people doing a great many things in this area at this time.**

## Josiah Gregg

**1844: The map to the right (and detail below) is from Gregg's 1844 book *Commerce of the Prairies*.**

**For its time, this map is extremely accurate. It shows major trading and travel routes. Note that La Jornado del Muerto is shown (see detail), as are the San Diego crossing and Socorro.**

**Gregg traveled between Santa Fe and Chihuahua in 1836 and 1837, presumably along the route depicted on this map. He later ventured southward with the American forces during the U.S.-Mexican War. He settled in Saltillo, Mexico, for a while and did most of his plant collecting in that area.**



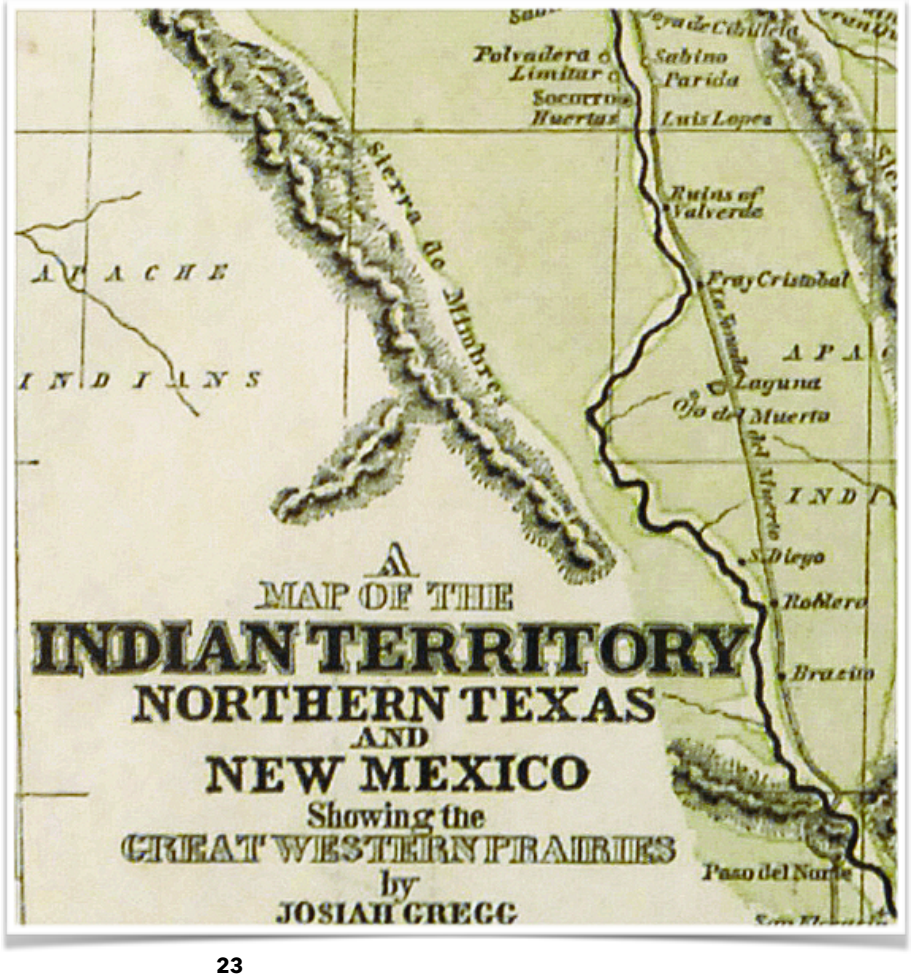

**In 1848 and 1849, Gregg traveled to Mexico with Friedrich A. Wislizenus (see page 26).**

**He collected many plant specimens, and at least 80 were named in his honor. (Forty-seven still bear *greggii* as the species epithet.) His interest in plant collecting may have been encouraged by his friendship with George Engelmann.**

**Although he travelled past the Black Range on more than one occasion, there is no record of him collecting specimens in the area.**

**Note the "Apache Indians" entry on the map. The territories of the major Indian nations were regularly shown on maps, particularly in the 1800's. Generally, such entries were meant to inform travelers of the presence of indigenous peoples rather than a recognition of sovereignty. All of these territories were, at least unofficially, assumed to belong to the European emigrants, be they Anglo, Spanish or Mexican.**

**At pages 192-196 of *Commerce of the Prairies*, Gregg gives a brief description of some of the animals he encountered, specifically Black and Grizzley Bear, wolf, elk, deer, Greater Roadrunner, prairie dog, horned lizards, scorpions.... A lot of natural history in a few paragraphs. His entry follows:**



**"Of wild animals there is not so great a variety as in the southern districts of the republic, where they are found in such abundance. The black and grizzly bear, which are met with in the mountains, do not appear to possess the great degree of ferocity, however, for which the latter especially is so much famed further north. It is true they sometimes descend from the mountains into the corn-fields, and wonderful stories are told of dreadful combats between them and the labradores; but judging from a little adventure I once witnessed, with an old female of the grizzly species, encountered by a party of us along the borders of the great prairies, I am not disposed to consider either their ferocity or their boldness very terrible. It was noon, and our company had just halted to procure some refreshment, when we perceived a group of these interesting animals, – a dam with a few cubs fully as large as common wolves, busily scratching among the high grass in an adjacent valley, as if in search of roots or insects. Some of our party immediately started after the brutes, in hopes of getting a shot at them, in which, however, they were disappointed. One or two 'runners,' who had followed on horseback, then made a desperate charge upon the enemy, but the old monster fled to the thickets, without even so much as turning once upon her pursuers, although one of her cubs was killed, and the remainder were scattered in different directions, during the general scamper.**

**The sequel of the adventure served to confirm me in the opinion I had of the exaggerated stories in regard to these much dreaded animals. We had in our company a giant blacksmith and general repairer of wagons, named Campbell, who measured full six feet eight in his stockings, and was besides, elegantly proportioned. Independently of his universal utility as 'Jack-of-all-trades,' our colossal friend was in such constant requisition, that he might well have given origin to the western phrase of one's being 'a whole team,' for if a wagon happened to be in the mire, he was worth more than the whole team to extract it. He was, in short, the most appropriate subject for a regular grizzly-bear scrape. On the occasion I speak of, Campbell had laid himself down under the shade of a bush, upon the brink of a precipice about ten feet high, and was taking a comfortable snooze, while his companions were sporting in the neighborhood. During the chase, one of the young bears, which had been scared from its mother, was perceived loping down the trail towards our camp, apparently heedless of the company. Several of us seized our guns, and as it sprang across the ravine through a break near the spot where Campbell lay, we gave it a salute, which caused it to tumble back wounded into the branch, with a frightful yell.**

**Campbell being suddenly roused by the noise, started up with the rapidity of lightning, and tumbled over the precipice upon the bear. "Whuah!" growled master bruin – "Murder!" screamed the giant – "Clinch it, Campbell, or you're gone!" exclaimed his comrades; for no one could venture to shoot for fear of killing the man. The latter, however, had no notion of closing clutches with his longclawed antagonist, but busied himself in vain attempts to clamber up the steep bank while the bear rising upon his hinder legs and staring a moment at the huge frame of the blacksmith, soon made up his mind as to the expediency of 'turning tail,' and finally succeeded in making his escape, notwithstanding a volley of shot that were fired after him.**

**The large gray wolf of the prairies is also to be found in great abundance in Northern Mexico. They sometimes make dreadful havoc among the cattle, frequently killing and devouring even mules and horses; but they never extend their rapacity so far as to attack human beings, unless urged by starvation. There are other animals of prey about the mountains, among which the panther is most conspicuous.**

**Elk and deer are also to be met with, but not in large quantities. Of the latter, the species known as the black-tailed deer is the most remarkable. It differs but little from the common buck, except that it is of darker color and its tail is bordered with black, and that, though its legs are shorter, its body is larger. The carnero cimarron or bighorn of the Rocky Mountains – the berrendo or antelope and the tuza or prairie dog of the plains – hares, polecats, and other animals of lesser importance, may also be considered as denizens of these regions.**

**Of wild birds, the water fowls are the most numerous; the ponds and rivers being literally lined at certain seasons of the year with myriads of geese, ducks, cranes, etc. In some of the mountains, wild turkeys are very numerous; but partridges and quails are scarce. There is to be found in Chihuahua and other southern districts a very beautiful bird called paisano (literally 'countryman'), which, when domesticated, performs all the offices of a cat in ridding the dwelling-houses of mice and other vermin. It is also said to kill and devour the rattlesnake; a reptile, however, which seems much less vicious here than elsewhere. Scorpions, tarantulas and centipedes also, although found in this province, are almost harmless, and very little dreaded by the natives. Another indigenous reptile is the horned-frog of the Prairies, known here by the name of camaleon (or chameleon), of which it is probably a species, as its color has been observed to vary a little in accordance with the character of the soil it inhabits.**

**The honey-bee would seem to have originated exclusively from the east, as their march has been observed westward, but none have yet reached this portion of the Mexican dominion. According to ancient historians, different species were indigenous to the south of the republic; but in the north, the only insect of the kind more resembles the bumble-bee than that of our hives; and builds in rocks and holes in the ground, in some parts of the mountains. They unite in but small numbers (some dozens together), and seldom make over a few ounces of honey, which is said, however, to be of agreeable flavor.**

**As to flies, like the high plains, this dry climate is but little infested – particularly with the more noxious kinds. Fresh meats are preserved and dried in mid-summer without difficulty, as there are very few blow-flies. Horse-flies are not seen except sometimes in the mountains: the prairie-fly, so tormenting to stock with us in the West, is unknown."**

**Such observations were the basis of much of the understanding of the natural history of the west. Undoubtedly, there were more learned materials available, but for most of the public it was the popular literature that shaped their perception of the west.**

**The pagination of the various editions is not the same, so page**



MEXICAN ARRIEROS WITH AN ATAJO OF PACK-MULES.

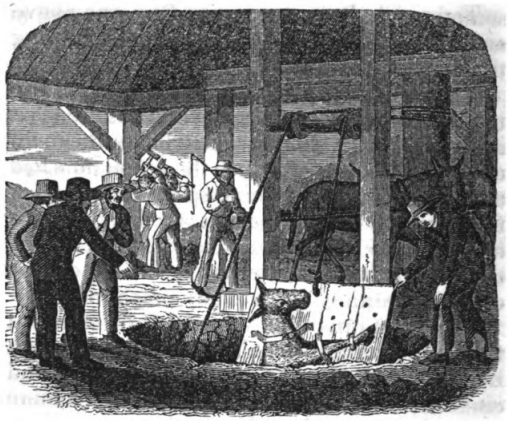
Original from UNIVERSITY OF CALIFORNIA
Digitized by INTERNET ARCHIVE

**Between pages 182 and 183 of Volume 1 (of the edition linked to above). This image from Commerce of the Prairies depicts a mule pack train. Pack trains like this were the major method of conveyance for many of the expeditions in the west.**

**numbers shown here will differ. Look to the table of contents of whatever version you are using. The images below were taken from Volume 2 of this edition.**

**I (the editor) have always been amazed at the amount of ingenuity, effort, and the reliance on an absurd amount of luck which went into mining in the Black Range. There were deep shafts, falling rocks, cave-ins, buckets lowering miners hundreds of feet etc. - all the time, as in, regular occurrences. When I came across the image to the left and the description of what was happening (albeit not in the Black Range - but easily imagined from the Black Range), I was awe-struck. Yes, that is a mule being drawn up (being lowered would have looked the same) from a mine shaft. The exploitation of the natural world causes many strange, perhaps wondrous (I have always loved the "theater of the absurd"), things to happen.**





The most important mine of Jesus-Maria at this time was one called Santa Juliana, which had been the means of alternately making and sinking several splendid fortunes. This mine had then reached a depth of between eight and nine hundred feet, and the operations were still tending downwards. The materials were drawn up by mule power applied to a windlass: but as the rope attached to it only extended half way down, another windlass had been erected at the distance of about four hundred feet from the mouth of the cavern, which was also worked by mules, and drew the ores, etc., from the bottom. On one occasion, as I was standing near the aperture of this great pit watching the ascent of the windlass-rope, expecting every moment the appearance of the large leathern bucket which they employ for drawing up the minerals as well as the rubbish and water* from the bottom, what should greet my vision but a mule, puffing and writhing, firmly bound to a huge board constructed for the purpose, and looking about as demure upon the whole as a sheep under the shears. On being untied, the emancipated brute suddenly sprang to his feet, and looked around him at the bright scenes of the upper world with as much astonishment as Rip Van Winkle may be supposed to have felt after waking up from his twenty years' sleep.

The ore which is obtained from these mines, if sufficiently rich to justify the operation, is transferred to the smelting furnaces, where the pure metal is melted down and extracted from the virgin fossil. If, on the contrary, the ore is deemed of inferior quality, it is then submitted to the process of amalgamation.

* Water has sometimes accumulated so rapidly in this mine as to stop operations for weeks together.

## Friedrich Adolph Wislizenus

**1846: Wislizenus journeyed from Santa Fe into Chihuahua, in 1846. He was a botanist and collected extensively. The map on the following page is from his book about the trip referenced here, "*Memoir of a Tour to Northern Mexico in 1846 and 1847*". This work was considered so informative that the U. S. Senate ordered 5,000 copies. The arrow indicates the Black Range (which is not filled in). While the United States was mounting expeditions during this period, Wislizenus simply took a tour.**

**He collected many plant species during his travel from Santa Fe to Chihuahua. Wislizenus provided specimens to his friend George Engelmann, who named several new species for him, including *Wislizenia refracta*, shown below. *Gambelia wislizenii*, the Long-nosed Lizard (photo above, taken at Cooke's Spring) was also named in his honor.**





**Wislizenus did not travel around the country with a military escort. Instead he travelled west with the Rocky Mountain Fur Company in 1839-1840, joined a group of Flathead and Nez Perce to cross the Rocky Mountains, and failing to cross the Sierra Nevada returned to his home in St. Louis. In addition to practicing medicine, he was a regular at the Western Academy of Natural Sciences where he befriended George Englemann.**

**He undertook his 1846 journey despite the recently proclaimed war between Mexico and America. He spent time in prison in Chihuahua, and true to spirit, he used that time to explore the area and make natural history collections ("Prison" is perhaps an overstatement.) In 1847 he, and other American prisoners, were rescued by Colonel Doniphan. On his return he wrote the above mentioned book.**


Senate. Mis' doc N° 26
MAP
of a tour from Independence to
SANTA FÉ, CHIHUAHUA,
MONTEREY AND MATAMOROS
BY A. WISLIZENUS,
in 1846 and 1847.
Explanation of signs:
Towns and Villages
Haciendas and Ranchos
Nightcamps
Astronomical Observations
(Long. of S Fe as determined by Lieut. Emory of U.S. Top. Engr)
Scale of 50 miles to one inch.
Independence
Pueblo
Bents Fort
Fort Mann
Santa Fe
Taos
Fort Towson
Fort Gibson
Van Buren
Red river
Arkansas River
Canadian r.
Brazos r.
Colorado r.
Rio del Norte
Rio Grande
Laredo
Monclova
Saltillo
Monterey
Matamoros
Reynosa
Presidio del Norte
El Paso del Norte
Chihuahua
Parras
Austin
Houston
Galveston
San Antonio de Bexar
Gonzales
Victoria
Goliad
Corpus Christi
Friedrichsburg
Bastrop
Washington
La Grange
Seguin
New Braunfels
San Augustine
Nacogdoches
Sabine r.
Trinity r.
Brazos r.
Rio San Marcos
Rio Guadalupe
Rio San Jacinto
Rio Colorado
Rio Nueces
Rio Frio
Rio Medina
Rio Salado
Rio Conchos
Rio Sabinas
Rio Alamos
Rio del Tigre
Laguna de Tulamas
Laguna de Tlaguala
Bolson de Mapimi
Sierra Blanca
Organ Mts
Cross Timber
Prairies
Gulf of Mexico
Arkansas river
Canadian r.
Red river
Rio Pecos or Puerco
Rio Grande
Rio del Norte
Caravan route from Arkansas to Chihuahua in 1846
Gregg's route from Santa Fe to Van Buren in 1839
Battle of Santa Fe. Expedition from Texas in 1841
Mil. Spanish military road from Santa Fe to San Antonio de Bexar
high arid table land or Stocked Plain
Gen. Kearny's route 1846
Camp Cooper
Camp Holmes
Camp Mason
Camp Salubrity
Camp Sacramento
Camp Comanche
Camp Wilson
Camp Crockett
Camp Cross
Camp Whiting
Camp Stockton
Camp Wilcox
Camp Jarvis
Camp Rio Grande
Camp Dimmitt
Camp Nueces
Camp Leona
Camp Encinal
Camp Lavaca
Camp Refugio
Camp Aransas
Camp Texas
Camp Harney
Camp Smith
Camp Ewell
Camp Lamar
Camp Bee
Camp Jones
Camp Henderson
Camp Belknap
Camp Wood
Camp Hays
Camp Crawford
Camp Colorado
Camp Verde
Camp Inge
Camp Lancaster
Camp Worth
Camp Hudson
Camp Johnston
Camp Pierce
Camp Lincoln
Camp Houston
Camp Montgomery
Camp Travis
Camp Gaines
Camp Sabine
Camp Jefferson
Camp Tyler
Camp Nacogdoches
Camp Shelby
Camp Bowie
Camp Scott
Camp Arbuckle
Camp Washita
Camp Towson
Camp Gibson
Camp Tahlequah
Camp Van Buren
Camp Independence
Camp Missouri
Camp Osage
Camp Cantonment
Camp Leavenworth
Camp Council Grove
Camp Mercer
Camp Big Blue
Camp Kansas
Camp Pawnee Fork
Camp Mann
Camp Big Timber
Camp Mora
Camp Turley
Camp Moore
Camp Bent
Camp Fisher
Camp Pueblo
Camp Spanish Peaks
Camp Tierra Amarilla
Camp Abiquiu
Camp Cañada
Camp Santa Fe
Camp San Miguel
Camp Anton Chico
Camp Rio Colorado
Camp Rio Pecos
Camp Rio Puerco
Camp Rio Grande
Camp Rio Conchos
Camp Rio Salado
Camp Rio Sabinas
Camp Rio Alamos
Camp Rio Frio
Camp Rio Medina
Camp Rio Nueces
Camp Rio San Marcos
Camp Rio Guadalupe
Camp Rio San Jacinto
Camp Rio Colorado
Camp Rio Brazos
Camp Rio Trinity
Camp Rio Sabine
Camp Rio Red
Camp Rio Arkansas
Camp Rio Missouri
Camp Rio Osage
Camp Rio Kansas
Camp Rio Pawnee Fork
Camp Rio Big Timber
Camp Rio Mora
Camp Rio Turley
Camp Rio Moore
Camp Rio Bent
Camp Rio Fisher
Camp Rio Pueblo
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Camp Rio Puerco
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Camp Rio Conchos
Camp Rio Salado
Camp Rio Sabinas
Camp Rio Alamos
Camp Rio Frio
Camp Rio Medina
Camp Rio Nueces
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Camp Rio Guadalupe
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Camp Rio Trinity
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Camp Rio Turley
Camp Rio Moore
Camp Rio Bent
Camp Rio Fisher
Camp Rio Pueblo
Camp Rio Spanish Peaks
Camp Rio Tierra Amarilla
Camp Rio Abiquiu
Camp Rio Cañada
Camp Rio Santa Fe
Camp Rio San Miguel
Camp Rio Anton Chico

## William H. Emory



Stephen W. Kearny was placed in command of the Army of the West in 1846. William Emory was attached to the military expedition of Kearny. The Mormon Battalion, under Cooke's command, was also part of the Army of the West.

Assigned to Emory were John James Abert, John L. Peck, William H. Warner, Norman Bestor, and John Mix Stanley (artist). This expedition was foremost a military venture in support of American efforts in the Mexican-American War.

Abert and Peck had left the expedition prior to its venture south from Santa Fe.

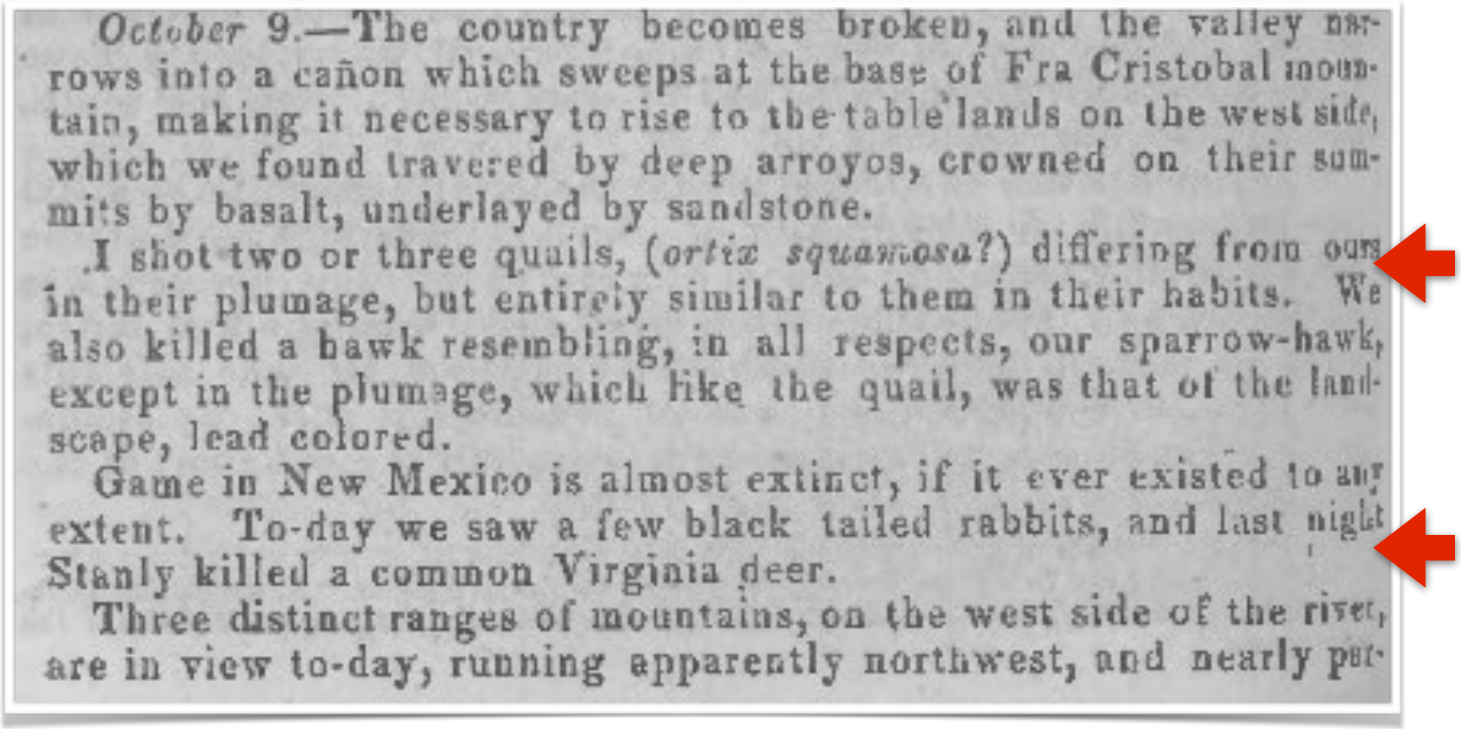
One of the problems which nagged Emory throughout his travels west was that the instrument he used to determine elevation proved to be very sensitive to any vibration, even to a horse passing by hundreds of feet away. This undoubtedly led to errors in determining the elevation of locations along the way.

The following account of his crossing of the Black Range picks up on October 9, 1846, and continues through to October 18, 1846. It also includes entries from other parts of the official record - *Notes of a military reconnoissance, from Fort Leavenworth, in Missouri, to San Diego, in California, including parts of the Arkansas, Del Norte, and Gila rivers.*

subspecies of Scaled Quail. The one noted by Emory in this report, and described by Abert in his reports, was not the nominate form. That subspecies is found only in Mexico.

The black tailed rabbit (photo on following page) mentioned by Emory is the Black-tailed Jackrabbit, *Lepus californicus*, which is still (like the Scaled Quail) common in this area.

The mountains Emory references were probably the Magdalena, San Mateo, and Black Ranges. Traveling across the table lands on the west side of the Rio Grande, and east of these mountains,



*October* 9.—The country becomes broken, and the valley narrows into a cañon which sweeps at the base of Fra Cristobal mountain, making it necessary to rise to the table lands on the west side, which we found travered by deep arroyos, crowned on their summits by basalt, underlayed by sandstone.

I shot two or three quails, (*ortix squamosa?*) differing from ours in their plumage, but entirely similar to them in their habits. We also killed a hawk resembling, in all respects, our sparrow-hawk, except in the plumage, which like the quail, was that of the landscape, lead colored.

Game in New Mexico is almost extinct, if it ever existed to any extent. To-day we saw a few black tailed rabbits, and last night Stanly killed a common Virginia deer.

Three distinct ranges of mountains, on the west side of the river, are in view to-day, running apparently northwest, and nearly per-

October 9, 1846. Account Starts on page 54 of *Notes of a military reconnoissance, from Fort Leavenworth, in Missouri, to San Diego, in California, including parts of the Arkansas, Del Norte, and Gila rivers*. At this point Emory is south of Socorro on the River.

The quail Emory references is the Scaled Quail, *Callipepla squamata;* its iconic silhouette is shown at the top right. The nominate subspecies had been described in 1830 by Nicholas Aylward Vigors, from a specimen from the Central Plateau of Mexico. Vigors described, at least, 110 bird species. Like many an authority, he was not a collector and never saw the Scaled Quail in its native habitat. There are currently four recognized

would have been (and is) hard traveling on foot, on horse (mule, etc.), or by wagon. It is in this general area that the early expeditions opted to exchange wagons for mules. The wagon roads which finally opened up going west from the Rio Grande were the precursors of the railroads which would dramatically change the human economy and society of the area - as well as the natural world.



**Black-tailed Jackrabbit, *Lepus californicus,* Tierra Blanca Road, Black Range, New Mexico, 7/2/2020**



**William H. Emory - later in life - Archives of the US. Military Academy at West Point.**



allel to each other. The lesser range commences at Socoro; the next at Fra Cristobal mountain, and the last at a point farther west, yet to be determined. The ravines between are broad, and show the beds of dry streams, which would probably be found watered when near their sources. A butte was seen in the distance, close to the river, and surrounded by trees, which was at first taken for an adobe house, but the near approach showed it a conglomerate cemented by lime, which had been left standing when the surrounding earths were washed away. At its base I found some rare specimens of olivine set in lava. The road was unbroken, obstructed by bushes, and so bad that the wagons made only 11½ miles, and the teams came into camp "*blown*" and staggering after their day's work. Expecting nothing better ahead, it was determined to leave the wagons and send back for pack-saddles. My own pack-saddles having been brought along, I had time to observe the rates of my chronometers and make other preparations necessary for so important a change in our mode of proceeding.

October 10th, 11th, and 12th were passed in camp waiting for the pack-saddles.

We are now 203 miles from Santa Fé, measured along the river; 16 circum-meridian altitudes of beta Aquarii, and 17 altitudes of Polaris give me for the latitude of the place 33° 20′ 02″, and the longitude, by the chronometer, 7*h*. 08*m*. 57*s*. We must soon leave the river. A cross section of it at this point is 118 feet wide, with a mean depth of 14 inches, flowing over large round pebbles, making it unsuitable for navigation with any kind of boats.

The height of our first camp on the Del Norte, one mile north of San Felippe, indicated by the barometer, was 5,000 feet, showing we had descended, from Santa Fé, 1,800 feet.

Here the height is 4,241 feet, showing an average fall in the Del Norte, from the camp near San Felippe to this place, of four feet and a half per mile. The greater part of the way the fall is uniform and unobstructed by rapids, and the river flows, for the most part, over a bed of sand, without any sensible increase or diminution in its volume of water. Sometimes its tranquil course is rippled by large angular fragments of basalt, trap, lava, and amygdaloid, which everywhere strew the table lands of New Mexico.

Our present camp is in a valley 70 or 100 acres in extent, well grassed and wooded, and apparently untrodden by the foot of man; for here we saw, for the first time in New Mexico, any considerable "signs" of game in the tracks of the bear, the deer, and the beaver. We flushed several bevies of the blue quail, saw a flock of wild geese, summer duck, the avocet, and crows.

Above and below us is a cañon, and on the eastern side of the river the Fra Cristobal shoots up to a great height. We saw on its sides, reaching nearly to the top, large black objects which we could not distinguish with our indifferent glasses, but which must be either shrubbery or rocks.

For the last night or two it has been unusually cold, the ther-

mometer ranging from 25° to 32° Farenheit, but during the day it mounts up to 75° and 80°.

*October* 13.—Moved one mile to get better grass. Just as we had pitched our new camp Lieutenant Ingalls came up with a mail, and gave the pleasant information that the saddles were only about six hours behind.

*October* 14.—We parted with our wagons, which were sent back under charge of Lieutenant Ingalls, and, in doing so, every man seemed to be greatly relieved. With me it was far otherwise. My chronometers and barometer, which before rode so safely, were now in constant danger. The trip of a mule might destroy the whole. The chronometers, too, were of the largest size, unsuited to carry time on foot or horseback. All my endeavors, in the 24 hours allowed me in Washington to procure a pocket chronometer, had failed. I saw then, what I now feel, the superiority of pocket over large chronometers for expeditions on foot or horseback. The viameter for measuring distances, heretofore attached to the wheel of the instrument wagon, was now attached to the wheel of one of the small mounted howitzers.

The valley narrows into a cañon at Bush peak, and opens again a mile or so wide, where we encamped for the night. The growth of to-day is much the same as yesterday.

Rush peak is, on its river face, a steep escarpment of basalt, and abreast of it, on the west side of the river, we saw many chips of metalliferous limestone. To-day, met a solitary Mexican mounted on a mule, driving before him a horse, with his back literally skinned with the saddle. He was beating the poor beast over the galled place. The Mexicans generally treat their horses and mules in a barbarous manner, riding and packing them when their backs are running with sores.

*October* 15.—After travelling three and a half miles, we turned off from the Del Norte and took final leave of it at a pretty little grove, where we found two Mexicans returning from a trading expedition to the Apaches. They were attending a poor worn out jennet, (that had been maltreated and overtasked,) in the hope that a few days' rest would enable it to take their lazy bodies to the settlements.

At this point, several intelligent guides were detached to look up a road further south, by which Captain Cooke, who is to follow us with the Mormons, may turn the mountains with his wagons.*

After mounting to the table-land, some 200 feet above the valley, it is very level, except where the table land is indented by the streams from the mountains, most of which are now dry. We passed two in succession, both deep and wide enough to contain all the water of the Mississippi, and presenting the appearance of the deserted beds of once large and turbulent rivers. The beds were paved with large round pebbles, mostly of the red fieldspathic granite.

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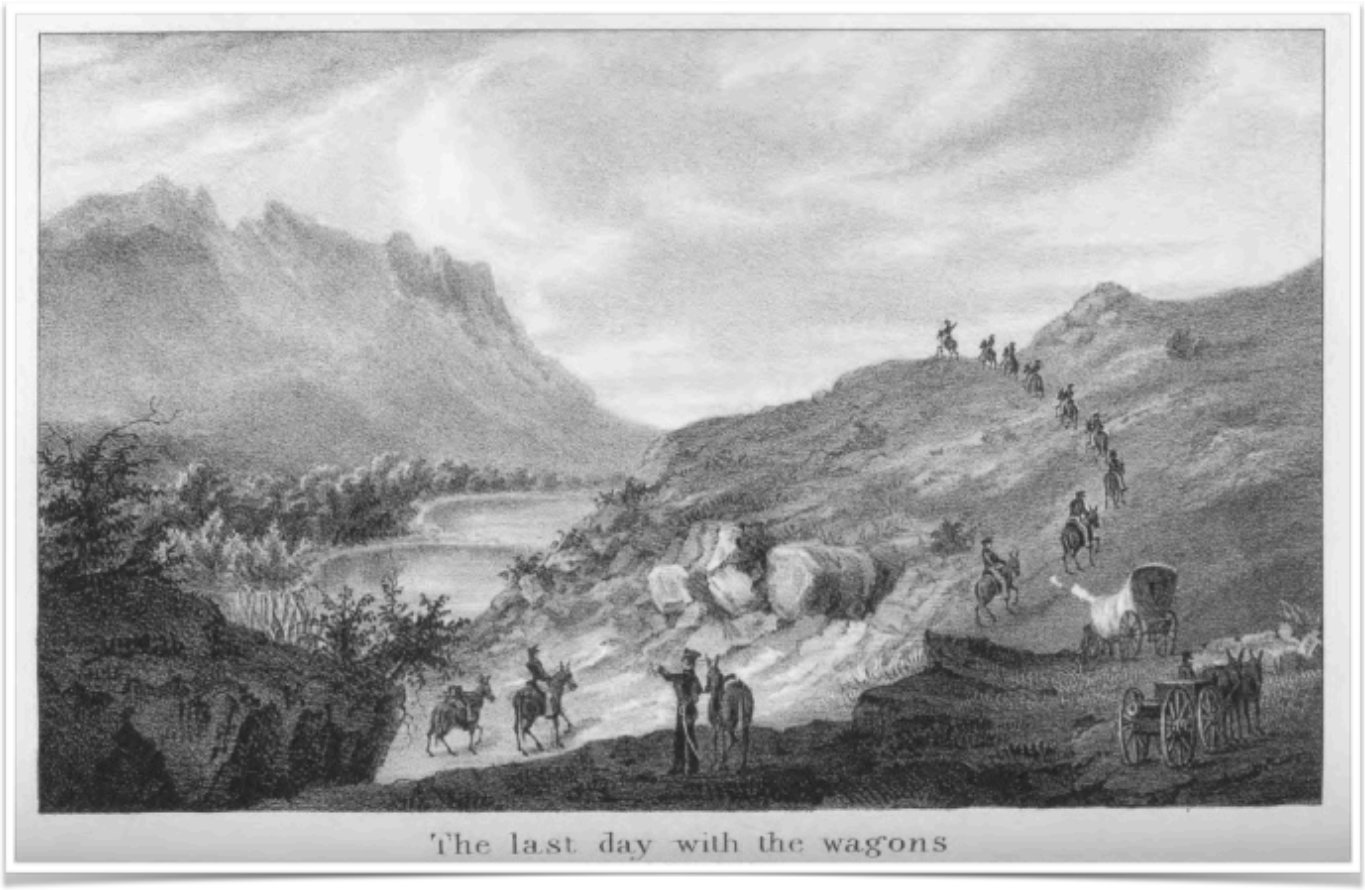
* The route followed by Colonel Cooke will be found traced on the map.



The last day with the wagons

From the 14th October to the 19th, we were crossing the great dividing ridge between the waters of the Del Norte and the waters of the Gila, nearly on the 33d parallel of north latitude, and between the 107th and 109th meridians of longitude, measured from Greenwich. The greatest height of this dividing ridge along our trail was about 6.000 feet above the sea.

**Portion of a letter written by Emory to Professor Torrey, Princeton, on July 22, 1847**

**The "new kind of black walnut, with fruit about half the size of ours" which Emory referenced on October 15 (following page) was most likely the Arizona Walnut, *Juglans major*, pictured to the right (from just west of Iron Creek Campground in the Black Range).**



**The path Emory followed in crossing the Black Range is a point of some controversy. Most agree, however, that he did not cross at Emory Pass (the route of NM 152). His instrument readings for the location indicate that the crossing could have been as far north as McKnight Peak. Measurements made during this era, by many people, often included a fair amount of error in the final determination. Both the instrument and the skill of the technician were to blame. Emory's measurement of elevation does not match a crossing at McKnight. The measurement of elevation is more consistent with a crossing farther south, probably at a location somewhat north of Cooke's Peak. There are reports of an ancient trail across the range in that general area.**

**The Black Range was often referred to as the Mimbres Mountains during this era. Today, "Mimbres Mountains" is still used in some sources to refer to the Black Range; sometimes it is used to refer to the very southern part of the range, sometimes including what is now commonly referred to as Cooke's Range. Care should be exercised in assuming that the name used in historical reports corresponds to the names used today.**

On the table land the winter grama (a more delicate grass than summer grama) was in great abundance, but now dry and sun burnt.

Far off to the south, between the peaks of two high mountains, stretched the table land contiguous to the valley of the Del Norte. For the first time since leaving the Arkansas the mirage was seen, and gave the wide opening the appearance of a sheet of water disturbed by the wind. Two distant peaks looming up looked, for all the world, like a fore-and-aft-schooner. As I was observing this my mule came to a halt at the edge of a steep precipice. Below were green trees and luxuriant foliage, the sure indication of water. The stream was clear, limpid, and cool, the first, but one, I had seen since crossing the Alleghanies, where water could be drunk without imbibing a due proportion of mud and sand.

In the valley grows cotton-wood, a new variety of evergreen oak, with leaves like the holly, a new variety of ash, and a new kind of black walnut, with fruit about half the size of ours. The oak was covered with round red balls, the size and color of apricots—the effects of disease or the sting of an insect.

Four miles further brought us to another creek of clear water, running sluggishly, and like the last the size of a man's waist. In its valley were many large trees, uprooted, presenting the appearance of newly cleared ground.

On the plains and in the dry valleys were many rare specimens of chalcedony. The only living thing seen was a small rattlesnake, the first since we left Vegas, of the size and mark of the small prairie snake, but of reddish hue, like that of the ground it inhabited.

Observed to-night for latitude and longitude; our height was (approximately) 4,810 feet above the sea.

*October* 16.—We commenced the approach to the Mimbres mountains over a beautiful rolling country, traversed by small streams of pure water, fringed with a stunted growth of walnut, live oak and ash. The soil in the valleys and to the hill tops of the best quality, covered with a luxuriant growth of grama, Chondrosium fœnum differing from the large grama. Nothing but rain is required to make this part of the country inhabitable. There were several new and beautiful varieties of cactus, and the Diotis lanata grew in great luxuriance; one a miniature tree, with the stalk six inches in diameter.

This must one day become a great grazing country, particularly for sheep. The pure dry air is eminently adapted to them, and they are said to be in all New Mexico very prolific, an ewe seldom failing to drop two lambs.

*October* 17.—We ascended from the stream, on which we were encamped, by a narrow valley for 2½ hours before reaching the summit between it and the Mimbres, which was so indistinct that I passed it several miles before discovering it. We descended in an arroyo towards the Rio Mimbres, very narrow, and full of shattered pitch stone; the sides and bank covered with a thick growth of stunted live oak. In full view, nearly the whole time of our de-

scent, was a mountain of peculiar symmetry, resembling the segment of a spheroid. I named it "the Dome." Our road led along its base to the north; another path leading to Janos, a frontier town in Sonora, passes down the Mimbres on the south side. The Mimbres was traversed only a mile; for that distance its valley was truly beautiful, about one mile wide, of rich fertile soil, densely covered with cotton wood, walnut, ash, &c. It is a rapid, dashing stream, about fifteen feet wide and three deep, affording sufficient water to irrigate its beautiful valley. It is filled with trout. At this place we found numberless Indian lodges, which had the appearance of not having been occupied for some time. We turned westward and ascended all the way to our camp.

The mountains appeared to be formed chiefly of a reddish amygdaloid and a brown altered sandstone, with chalcedonic coating. In places, immense piles of conglomerate protruded; disposed in regular strata, dipping to the south at an angle of 45°. There was also one pile of volcanic glass brittle, in strata about half an inch thick, dipping 45° to the south. The character of the country and its growth to day are very similar to those of yesterday; several new plants and shrubs, amongst which was the cercocarpus parvifolius, a curious rosaceous shrub, "with a spiral, feathery tail, projecting from each calyx when the plant is in seed." The spiral tailed or barbed seed-vessels fall when ripe, and, impelled by the wind, work into the ground by a gyratory motion. The cedar seen to-day was also very peculiar; in leaf resembling the common cedar of the States, but the body like the pine, except that its bark was much rougher. (For the rest of the day's growth, see catalogue of plants for this date.)

At night, 12 circum-meridian altitudes of beta Aquarii, and seven altitudes of Polaris, give for the latitude of the camp 42° 11′.

*October* 18.—A succession of hills and valleys covered with cedar, live oak and some long-leafed pine. We passed at the foot of a formidable bluff of trap, running northwest and southeast, which I named Ben Moore, after my personal friend, the gallant Captain Moore, of the 1st dragoons. In many places the path was strewed with huge fragments of this hard rock, making it difficult for the mules to get along. Turning the north end of Ben Moore bluff, we began to drop into the valley of what is supposed an arm of the Mimbres, where there are some deserted copper mines. They are said to be very rich, both in copper and gold, and the specimens obtained sustain this assertion. We learned that those who worked them made their fortunes; but the Apaches did not like their proximity, and one day turned out and destroyed the mining town, driving off the inhabitants. There are the remains of some twenty or thirty adobe houses, and ten or fifteen shafts sinking into the earth. The entire surface of the hill into which they are sunk is covered with iron pyrites and the red oxide of copper.

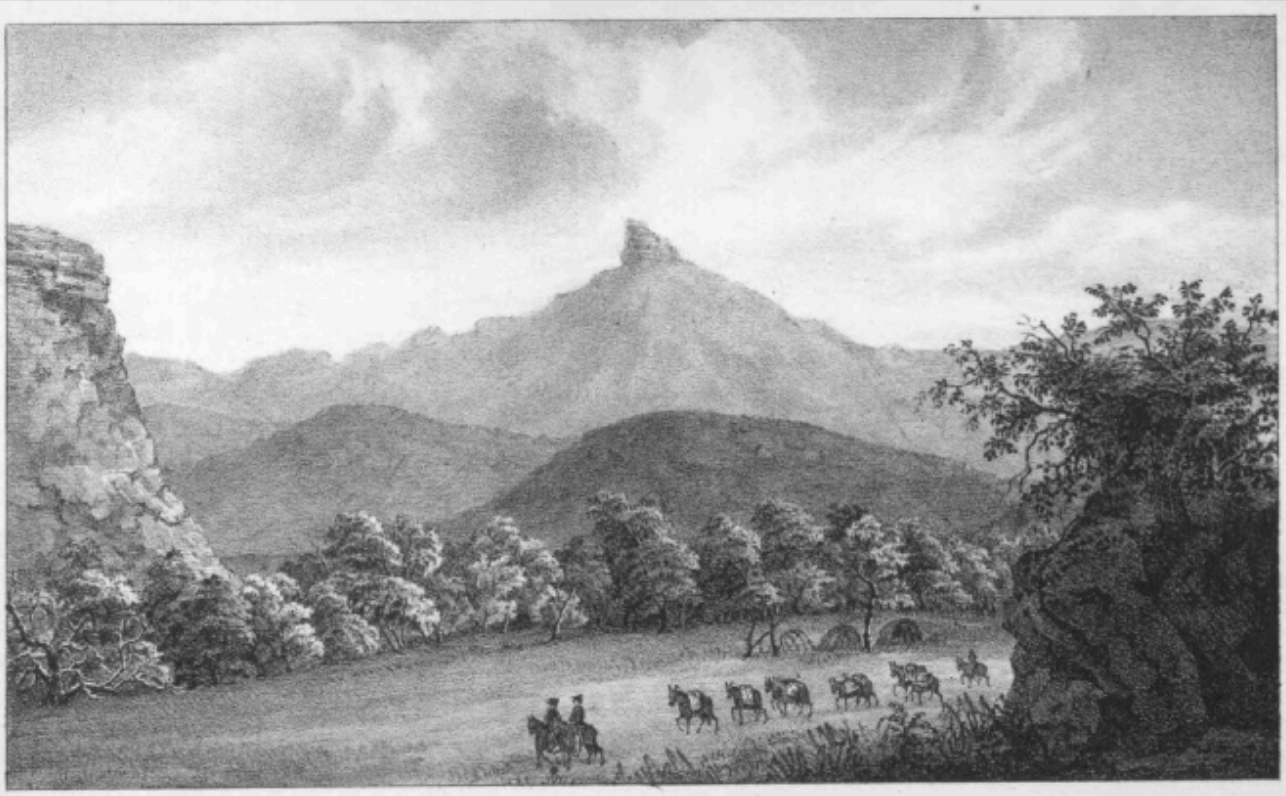
Many veins of native copper were found, but the principal ore is the sulphuret. One or two specimens of silver ore were also obtained.

Mr. McKnight, one of the earliest adventurers in New Mexico,

**Ben Moore**

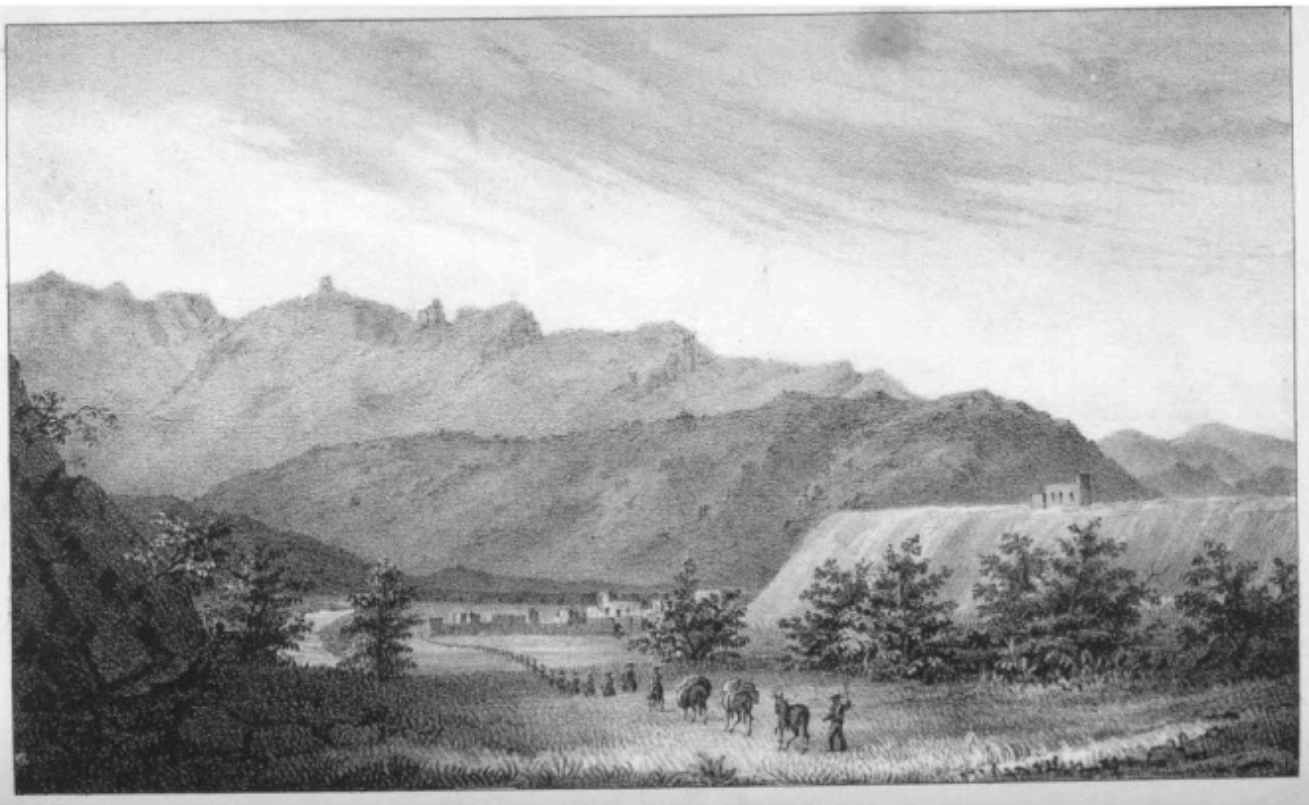
**Ben Moore is the name given by Emory to the cliff face just south of the Kneeling Nun formation above the Santa Rita Mine.**

**See *The Kneeling Nun, Santa Rita, New Mexico* by Eveleth and Osburn for more information about the geology and local history of the Kneeling Nun.**



Valley of the Mimbres

Lith by F. Weber & Co. Balto.



View of the Copper mine

was the principal operator in these mines, and is said to have amassed an immense fortune. On his first arrival in the country he was suspected to be an agent of the United States, and thrown into prison in Sonora, where he was kept in irons for eleven years. He is said to have stated that the gold found in the ore of these mines paid all the expenses of mining, and the transportation of the ore to the city of Mexico, where it was reduced.

We were disappointed in not meeting the Apaches yesterday and to-day. This afternoon three men came in dressed very much like the Mexicans, mounted on horses. They held a talk, but I do not know the purport. This afternoon I found the famous mezcal, (an agave,) about three feet in diameter, broad leaves, armed with teeth like a shark; the leaves arranged in concentric circles, and terminating in the middle of the plant in a perfect cone. Of this the Apaches made molasses, and cook it with horse meat.

We also found to-day the Dasylirion graminifolium, a plant with a long, narrow leaf, with sharp teeth on the margin, with a stalk eighteen feet high. According to Doctor Torrey, it has lately been "described by Zuccarini," who says "four species of this genus are now known, all of them Mexican or Texan."

The elevation of this camp was 6,167 feet.

*October* 19.—I tried last night to get observations for latitude, &c., but the early part was cloudy, and we fell asleep and did not wake till broad daylight. In the afternoon there was a thunder-storm to the west, which swept around towards the north, where it thundered and lightened till nearly 9 o'clock. The country passed over in the first part of to-day was beautiful in the extreme; a sucession of high, rolling hills, with mountains in the distance. The soil rich, and waving with grama. The latter part was more barren, and covered with artemisias.

The spring of San Lucia, 13½ miles from the copper mines, very large, and impregnated with sulphur, is in a beautiful valley, surrounded, at the distance of ten or fifteen miles, with high mountains. This was the place appointed for meeting the Apaches, at 11, a. m.; but arriving at 12, and not finding them as we expected, and the grass all eaten up, we moved on to Night creek, making 30 miles. We halted at night on unknown ground, by the side of a creek, so miry that the mules, some of which had not drunk since morning, refused to approach it. It was dark; many of the men mistook the trail and got on the wrong side of the treacherous creek. The mules began to bray for water, and the men to call out for their messmates; all were in confusion. My thoughts of last night came vividly to my mind, as I heard the voice of my chronometer man on the other side, asking to be shown the way across. I sent him word to retrace his steps two or three miles.

The assembly call was sounded, which seemed to settle all things; and, as far as the clouds would allow me, I obtained observations. This is only the second time since leaving the 100th degree of longitude that I have been interrupted by clouds in my observations. Nothing has been heretolore more rare than to see the heavens overcast.

San Lucia now called Mangas Springs

**The report included an appendix by John Torrey. Excerpts from the appendix and images of the plants described in the report are provided here and on the two following pages. Unlike in his role later, as part of the Boundary Survey, Emory was much more a "hands-on" naturalist on this expedition.**



LARREA MEXICANA, *Moricand, pl. nov. t. 48 "Creosote plant.' Iodeodondo* of the New Mexicans. Used externally for rheumatism. A shrub from three to six feet high. Abundant from the upper waters of the Arkansas and valley of the Del Norte, to the great sandy deserts of California. It likewise occurs in the northern parts of Mexico. The plant abounds in a strong smelling resinous matter. No animal seems to feed on it, and it is useless for fuel, as it can scarcely be made to burn.

**Appendix by Professor Torrey: Now named *Larrea tridentata*, Creosote Bush or Greasewood, photo below left.**





R. TRILOBATA, *Nutt.* On the Gila. A shrub 18 inches high, found late in the autumn, with staminate aments nearly matured for the following spring. The whole plant is clothed with a dense velvety pubescence. It is, perhaps, a distinct species from *R. trilobata.*

**Appendix by Professor Torrey: *Rhus trilobata*, Lemonadeberry, photo above right.**



DALEA FORMOSA, *Torr. in Ann. lyc. N. York, 2. p.* 178. This beautiful species was first detected by Dr. James, in Long's first expedition. It is a shrub about three feet high, with numerous crooked branches, and purplish flowers. Near Santa Fé, and valley of the Del Norte.

**Appendix by Professor Torrey: *Dalea formosa*, Indigobush, top of following page.**





PROSOPIS GLANDULOSA, *Torr. in Ann, Lyc. N. York*, 2. *p.* 192, *t.* 2. (mezquite.) Abundant in the valleys of all the rivers, from Santa Fè, west. The trunk of this tree is sometimes 14 inches in diameter. The pods are long, flat, and filled with a sweetish pulp. They are excellent food for horses and are sometimes used by men in times of scarcity.

**Appendix by Professor Torrey, p. 139: Prosopis glandulosa, Honey Mesquite, left.**



[7] 140

GEUM VIRGINIANUM, *Linn.* On the Arkansas.

FALLUGIA PARADOXA, *Endl. gen.* 6385, *Sieversia paradoxa, Don in Linn., trans.* 14, *p.* 576, *t.* 22. A remarkable rosaceous shrub, with white flowers, and very long slender plumose tails to the carpels. It differs, in some respects, from Endlicher's character of the genus, but I have not had an opportunity of comparing it with Don's description and figure. It was found in various parts of the valley of the Del Norte. Can it be *Geum dryadoides, DC?*

Appendix by Professor Torrey: *Fallugia paradoxa*, Apache Plume, Above



G. PARVIFLORA, *Dougl.* Valley of the Del Norte.

Appendix by Professor Torrey, p. 141: *Gaura parviflora*, now *Oenothera curtiflora*, Velvetweed, Above

Appendix by Professor Torrey, p. 141: *Cevallia sinuata*, Stinging Serpent, Below



an inch long, 3-valved at the summit.

CEVALIA SINUATA, *Lagasca.* This interesting plant, which has been admirably illustrated by Fenzl, occurs in many parts of the valley of the Del Norte, from Santa Fé to Saltillo.

## Philip St. George Cooke



**1846: Cooke travelled through the southern end of the Black Range in November 1846. The photograph of him (to the right) was taken just over 10 years later.**

**The January 3, 2020 issue of the *Black Range Naturalist* includes an article about the natural history of the trail Cooke and group used to cross the Range south of Cooke's Peak.**

***Volume 7 of Exploring Southwestern Trails 1846-1854*, contains a transcription of Cooke's personal journal (not the official report of the march). This volume of the series, edited by Ralph P. Bieber, was published in 1938. At pages 26-28, part of the editor's summary of Cooke's Personal Journal, the following quotations occur:**

> **"On October 15, when Kearny left the Rio Grande and marched southwest, he assigned Cooke 'the task of opening a wagon road to the Pacific.' The same day Lieutenant Emory, of the topographical engineers, recorded that 'several intelligent guides were detached to look up a road further south' by which Cooke might 'turn the mountains with his wagons.'" (Correspondence from Kearny to Jones, October 11, 1846) "Upon reaching the Copper Mines three days later, Kearny held a council with some Apache Indians and made further arrangements to provide guides for the**

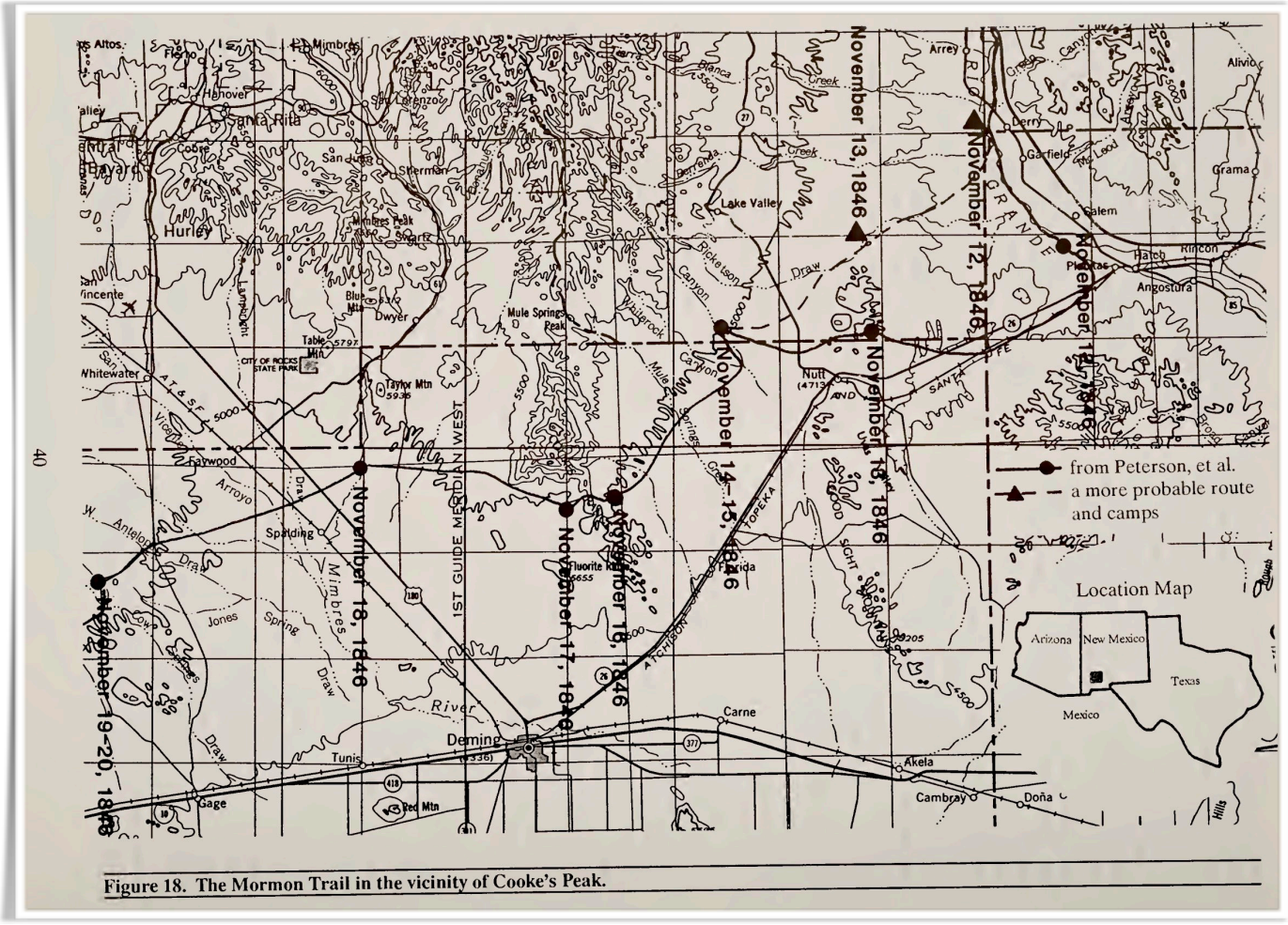



Figure 18. The Mormon Trail in the vicinity of Cooke's Peak.

# List of the Different Names Used for the Road

The following names were used at various times to denote the road that penetrated Cooke's Canyon. Some are quite dated and local but others were used nationally. In many instances, the words Road, Trail, or Route were applied interchangeably. Additional, but similar, names are noted parenthetically.

Butterfield Trail
California (Cattle) Trail
Cooke's Wagon Road
Destiny Road
El Dorado Trail
El Paso-Fort Yuma Road
Fort Yuma and Rio Grande Road
Franklin-(Fort) Yuma Road
Gila Trail
Great Southern Mail Road
Great Pacific Trail
Leach's Government (Wagon) Road
(Main) Emigrant Road to California
Mesilla-Tucson Road
Mormon Battalion Trail
Mormon Road
Overland Mail Company Route
Overland Trail
Ox-Bow Route
Rainbow Trail
San Antonio-San Diego Mail Route
Silver City and Arizona Road
Southern Indian Trail
Southern Emigrant Road
Southern Road to California
Southwestern Trail
Southern Wagon Road

**As noted on page 259 of *Cooke's Peak - Pasaron Por Aqui - A Focus on United States History in Southwestern New Mexico*, the trail which runs west from Cooke's Spring has been known by many names. A source you are researching may have used any of them.**

**Mormon Battalion. Captain Henry S. Turner, acting assistant adjutant-general of the Army of the West, immediately wrote to Cooke: 'Red Sleeve, the Apache chief, had an interview with the general today & has promised to send some of his young men to conduct you by a good route to the Rio Gila, when they meet you. The general desires that you will treat them well & make use of them as guides ..." (Correspondence from Turner to Cooke, October 18, 1846) "...Arriving at the Ranches of Albuquerque on October 24, he met some of the guides sent back by Kearny. One of them, named Charbonneau, reported that they had explored a route somewhat different from that taken by the dragoons, but Cooke concluded that their work was not entirely satisfactory" . . . Of some interest to us, is the fact that Cooke decided that once he crossed (what is now known as Cooke's Range) he would "follow the Janos road until I can turn off (probably two days on this side), as the best road, or route to the same point of the Gila". The Janos road, from the Copper Mines to Janos was well established and used regularly by this time.**

**Cooke's personal account - *Journal of the march of the Mormon Battalion of infantry volunteers under the command of Lieut. Col. P. St. Geo. Cooke, also captain of dragoons, from Santa Fe N.M. to San Diego, Cal. - kept by himself by direction of the comd'g General Army of the West* - begins at page 65 of the cited work (*Exploring Southwest Trails*). The following material is from the personal journal as transcribed in the cited work.**

**"October 24...(at Albuquerque) I met here Charbonneau, one of the guides left for me, who reports that he had examined a route different in part and farther than that taken by the general, viz., to descend the river farther and fall into a road from El Paso to the Copper Mines. The report is favorable; but they did not make a thorough examination by any means; and the practicability of the route from the Copper Mines to the Gila is still a problem." (pp. 74-75)**

**"November 9. Leroux (ed. one of the guides) came back last evening; he went down about fifty miles, struck off where the river turns east at San Diego, and in fifteen miles found some water holes. Then he saw from a high hill a creek running out of the mountain at an estimated distance of thirty miles (the next water), over a rather level plain." (p. 94)**

**"November 13. After following the river (ed: Rio Grande) this morning a mile or more, we found a pole and note from Leroux, but met at the same time two of the guides, who directed us short to the right to leave the river, stating it was fifteen miles to water. (ed. Near present day Rincón they turn west.) I followed a smooth inclined plain (between two bluffs) three miles and then had a steep ascent; then following ridges and making ascents occasionally, we reached another inclined bed of a rainy-weather stream; from this we wound up a long valley to a ridge which bounds it, following that over a" (p. 98). The remainder of this section is shown here as printed in the cited work.**

very rocky prairie. Charbonneau had gone to the head of the inclined plain and found, he thought, an outlet. The water is at its head; but he did not return in time to direct all the wagons; and it is doubtful with me if it would have been better. The wagons arrived at this ground about an hour by sun, having come fifteen or sixteen miles and all uphill, the prairie usually being gravelly and not rough. The water is about one hundred feet lower than the camp, in a rocky chasm difficult of descent for animals; the chief supply is a natural rock-bound well thirty feet in diameter and twenty-four feet deep. It contains about fifty-five thousand gallons. Many feet below it are two smaller holes, which the animals can get at, two or three at a time. There is no fuel, save a few bushes and Spanish bayonets. The country is well covered today with grama grass, and also I saw buffalo grass. We came over a high point, and had a fine view of the Órganos and the El Paso mountains, and the mound called "San Diego," where the river turns to the east. For a road coming up the river, there is a very fine valley gradually ascending to this point. The course today, allowing for a variation of the needle of 12° E., was southwest. Some antelopes were seen.

NOVEMBER 14. Expecting to march thirty miles (to the Mimbres) without water, and after the hard and late march yesterday, I lay [by] until near ten o'clock and cooked a ration; then all the animals were watered, and I got off twenty minutes after eleven o'clock. We proceeded in a direction 35° west of south. After a mile of ascent over rolling ground, we struck the margin of a vast plain surface extending indefinitely to the southwest and slightly inclined toward us. After coming about four miles, we met one of the guides, who stated that Leroux was at a stream seven or eight miles more to



our right, near the mountain range, that the Mimbres had not been found, etc. I then took his course, southwest, proceeded about five miles, when he bent more to the right, and finally nearly a mile short to the right, into a valley, where a stream running from the hills and mountain to the right loses itself in the sand; near-by, above, is a fringe of timber – cottonwoods, ash, etc. The prairie today was generally covered thick with large gravel, with intervals of clay, all well covered with grass, both grama and buffalo, in places quite green and luxuriant. We came through prairie dog villages, always found with buffalo grass.

Thus Leroux on his second trip (or third, if he had attempted the exploration promised by the general) has only reached about forty miles from the river! I have no guide that knows anything about the country; and I fear such exploring, as we go, will be very slow or hazardous work. Leroux goes tomorrow with six men, and he is to send back one, every day's journey (for me), to meet me (he going that day double) until his party becomes too small. It is cold and cloudy, with a high southwest wind. Some expectations of snow are entertained. Lofty mountains, distant and isolated, rise here and there from the great smooth plain I have mentioned. Such is the general characteristic, I am told, of Mexico. The Mimbres, which I was led to believe we would reach tomorrow, it is now thought by the guides may not be reached the day after! Just in the camp is apparently the foundation of a house; the stones, though large, are rounded; it rises a foot or two from the ground. This is the plan. . . Close by, besides fragments of earthen pottery, is a broken mortar of a very hard red stone resembling a buhrstone. All the exterior is apparently in its natural rough state; there seems to be no other similar stone near.



They would have encountered the Black-tailed Prairie-Dog, *Cynomys ludovicianus*.

NOVEMBER 15. Eight o'clock A.M. The guides are behindhand. It rains a little, and there is no fuel at the next camping ground. There being good grass and fuel here, I have reluctantly concluded to lay by today; but I have no doubt of its being for the general advantage. Leroux, Mr. Hall, Doctor Foster the interpreter, Charbonneau, and three Spaniards have gone, and I have urged the necessity of an active and more distant examination of the country.

Evening. It has blown a gale all day, raining, snowing, and shining alternately; it is very cold, although the wind is but little west of southwest. I sent for an ox which was left yesterday "given out," and had it slaughtered, and, together with the smallest and poorest beef, [had it] issued as a ration, gaining thereby about a third of a ration.[161] I have calculated now, at the rate of issue, that we have, after today, ninety days of meat and eighty-six of flour.

NOVEMBER 16. A clear, cold day, with a high west wind blowing directly from the snow in sight on the low mountains close to our right. Our course today S. 15° E., bending slightly to the right into a curve, or shallow cove, of the mountains. Here, at their feet, after coming about thirteen miles, we find a small swampy hole of water, apparently insufficient, with plenty of black mud close to the surface.[162] Many old Indian trails concentrate here, and the grass is unusually poor.

[161] On November 15, Henry Standage wrote: "Laid by encamp'd in a valley waiting for the old ox to come up. . . About 3 o'clock P.M. we received our share of the white ox. It is really the poorest beef that can be imagined and not only is there a lack of fat, but it is covered with sores caused by the blows received from day to day in order to get the poor thing along through the deep sands. Some complain a little at this kind of meat." Golder, Bailey, and Smith, *op. cit.*, 183-184.

[162] "This has found its way to some of the maps as Cooke's Spring," recorded Cooke some years later. Cooke, *Conquest of New Mexico and California*, 126.



*The spring house at "Cooke's Spring" was built in 1881.*



The road today generally level, but with a few stiff rises and hollows to pass. Country well covered with grass; the soil seems good, with less gravel and stones. Charbonneau has returned and reports the gap just before us to be practicable, and that there is water six miles from here. He went with the others about twelve miles beyond it without finding other water. It was found to be about twenty miles round the point of the mountain to the south, and that way the guides went. Charbonneau reports favorably of the appearance of the country beyond the mountain; an open plain to the west, a little north. There is an irregular enclosure of rocks piled up (about three feet) on a hill near camp, probably a temporary defense of some of the Indians of the country. Very pretty, partially crystallized siliceous cinders are very common. There is no wood, but with brush, Spanish bayonets, etc., we make out pretty well. I felt yesterday almost confident that we might have crossed the mountain to the west of our last camp, where Leroux has been twice exploring. This evening I am told that one of the men went over yesterday hunting and reports it passable (too late). It would have saved much distance, and Leroux should have examined it.

NOVEMBER 17. Another bright morning, with a cold northwester. I marched to the southwest, up a winding valley and over the ridge, down to near the verge of the open prairie beyond; up a ravine to the right of the road (going to the north) is the water. In this mouth of the pass I was compelled to encamp a little after ten o'clock, having marched only three miles (which Charbonneau had called six). We saw today a new variety of oak – a large luxuriant bush eight to ten feet high, with leaves about an inch long; they are still very green. Also a new and beautiful variety of the Spanish bayonet, very



*A dry disused tank at Frying Pan Spring, May 2018.*

**There are two road videos which are useful if you wish to get a feel for the area described here: 1) A Trip Into Cooke's Peak - starting at NM-26, to the south, this video follows a track to just north of Cooke's Peak; and 2) Frying Pan Access Road, which approaches the camp spot of November 17, Frying Pan Canyon, from the west.**

**The summit of Cooke's Peak, named after Cooke following his passage, has an elevation of 8,404 feet; it is an imposing feature both in shape and mass. The Apache called it "Standing Mountain", the Spanish called it Picacho de los Mimbres and Cerro de los Remedios - the latter from Pacheco's map of 1758. The Ft. Cummings site is on the plains at the base of the mountain, at Cooke's Spring - where the Mormon Battalion camped on the night of November 16.**

**For context: Remember that Cooke's Spring was a regular stop on the Gila River Trail, which was a major route from Santa Fe**

large and spherical in shape, the largest leaves near three feet long and indented like a fine saw, with a pole eighteen feet high from the center. Tesson killed in the mountain two of the domestic goats with cropped ears; they were very wild; stolen, I suppose, and then lost, by the Indians.[163] I have been on a peak three hundred feet high; a view of our exact course was obstructed by a higher mountain close by; but in that direction – west – only slight and smooth (looking) elevations could be seen. But alas, where shall the water be found? To the south it is a vast level, from which, irregularly, rise conical hills, mountains, and short ridges, evidently from volcanic eruptions. This ridge was covered with brown sandstone, hard and fine. I saw there a flock of partridges of a new species; they are rounder, smoother, have longer necks, and a beautiful plume to the head, and are slate-colored. Two new splendid varieties of the cactus are found here: one a solid hemisphere, with ridges and horny hooks three inches long; the other with the leaf seven inches long, also round and ridged, but velvety and variable in color from pink and purple to nearly black.

NOVEMBER 18. After a severe night, with a very high north wind, we had a bright calm morning. Water, however, froze solidly over in vessels after sunrise. One of the Mexicans whom I hired as a shepherd came back yesterday at three o'clock afoot and reported the Mimbres eighteen miles distant. I march this morning before eight. About two miles disengaged me completely of the defile, when we followed a course 40° north of west over a tolerably smooth, firm prairie, a little rolling

[163] The battalion was still without adequate food supplies. "I eat guts today for the first time though many have eat them before," noted Standage on November 17. Golder, Bailey, and Smith, *op. cit.*, 184.



and occasionally sandy, but generally a good soil. After making ten miles from a hill, we saw the Mimbres's timber 25° nearer the west, and down a smooth descent, apparently about five miles; we found it eight. I have observed that rising ground, particularly if it bounds your horizon, and descending ground are both very deceiving. In the first case an object will appear more distant, and in the latter much nearer, than the reality. The prairie this afternoon is more gravelly and covered with small stones. The wagons came in after eight and a half hours' steady pulling.[164] This is a fine, clear, bold stream, and is in places fringed with trees – amongst others, walnut – and with thickets of osiers (whence its name).[165] It is a pleasant camp ground; but no guide is here for tomorrow. There is a mountain before us – to the west – tapering to a distant point on the left and sinking to a high ridge on the right; but where is water or our most advisable course? Heaven knows! We are exploring an unknown region with wagons. It is believed that our camp three days ago is within a day's march (a long one), but the guide differs from me as to the direction of the gap; he thinks it northeast of this camp. The next traveler on this road, I hope, will pass the ridge at that camp, as my guides doubtless should have done, and cut off fifteen miles. There were thirty mortars found this morning cut into a solid rock, for corn or ore.

NOVEMBER 19. After a warm day, the sun blistering the face, water froze last night an inch thick. Doctor Foster, the interpreter, came in last night and reported the Ojo de Vaca, on the Copper Mine and Janos road,



*Cooke may be describing the Gambel's Quail, Callipepla gambelii. It is at the eastern edge of its range here and would have been "new". It had only been scientifically described, by Gambel, three years before. When not huddled down their necks appear much longer.*



*The pass Cooke is speaking of is probably the one just north of Cooke's Peak. The approach to the ridge line, from the east, is shown here. Although shorter, it is doubtful that it would have been faster - certainly not easier.*

to Los Angeles and San Diego in the 1830's. For instance, David Jackson led a party through the area in 1832, heading for California from Santa Fe.

Cooke does not mentioned the petroglyphs at Frying Pan Canyon, even though they were only yards away from camp. Many of his men did, however, with widely differing interpretations.

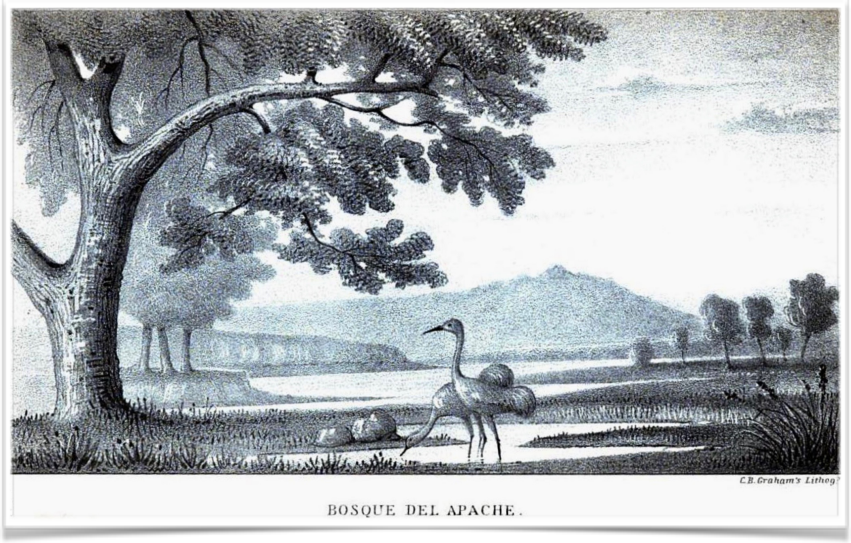


Cooke's Spring in 1882, a year after the spring house was built.

## James William Abert

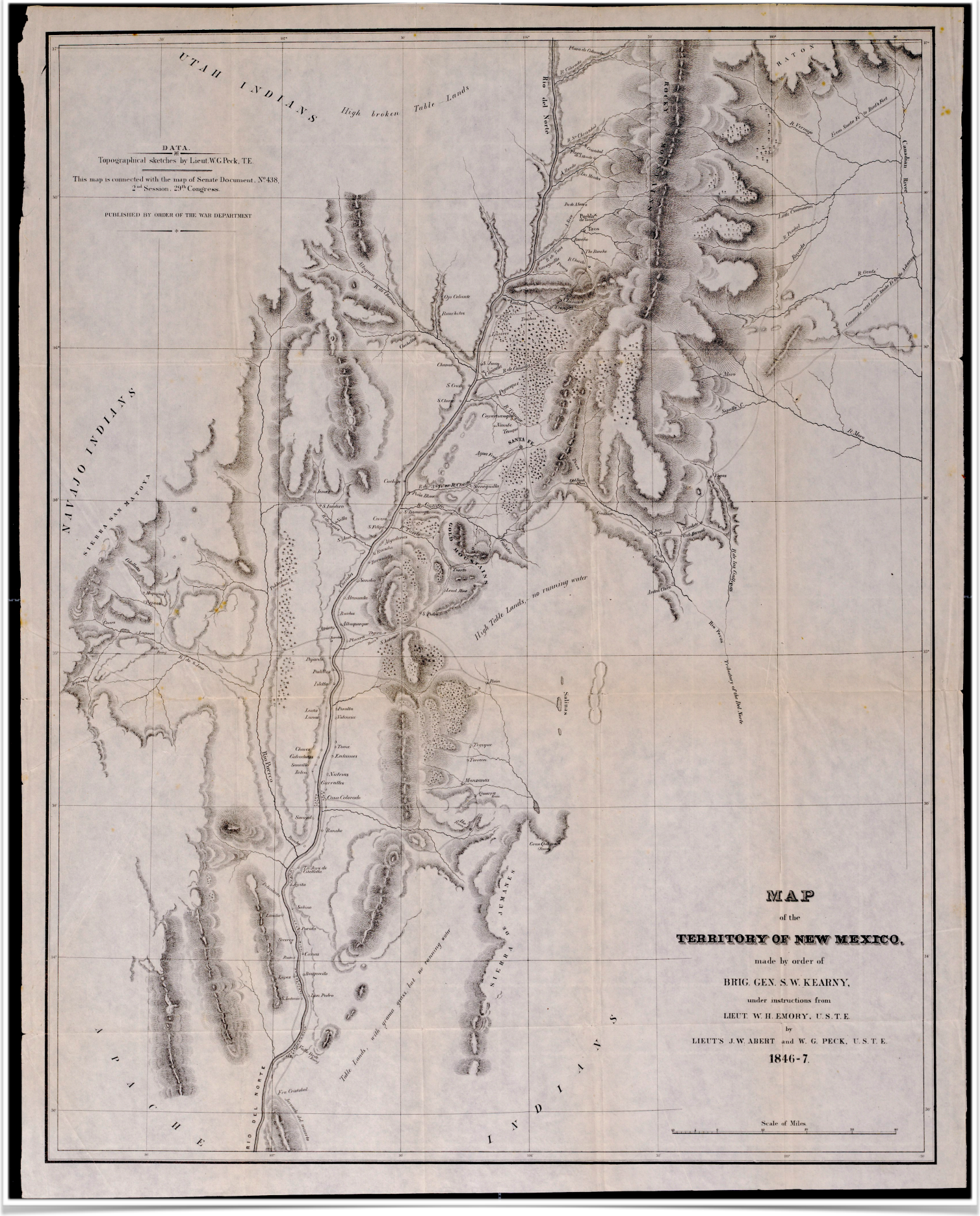
Abert was with Stephen W. Kearney on his march from Santa Fe to San Diego in 1846. He left the expedition at Fort Bent to recover from illness. He then went on to New Mexico to conduct survey work. He collected several mammal and bird species along the Middle Rio Grande as far south as Valverde. A map drawn by Abert and Peck, in 1846-47, is shown on the following page. The northern part of the Black Range is (apparently) shown in the lower left hand corner - just above "Apache".

The Abert's Towhee was first collected by Abert (and was named in his honor) in New Mexico. The specimen must have been at the very edge of its range and at the southwestern extent of Abert's explorations.




The image to the right is taken from Abert's "*Report of The Secretary of War, Communicating the Answer to a Resolution of the Senate - A Report and Map of The Examination of New Mexico Made by Lieutenant J. W. Abert*", 1848. This report, of Abert's activities in New Mexico in 1846, is one of the best descriptive works of the time, descriptive of both the culture and the natural history of New Mexico.

Abert did not enter the Black Range. He did journey south of Socorro but his personal reconnaissance never took him further.


UTAH INDIANS
High broken Table Lands
DATA.
Topographical sketches by Lieut. W.G. Peck, T.E.
This map is connected with the map of Senate Document, Nº438, 2nd Session, 29th Congress.
PUBLISHED BY ORDER OF THE WAR DEPARTMENT
Rio del Norte
ROCKY MOUNTAINS
RATON
Canadian River
NAVAJO INDIANS
SIERRA SAN MATOYA
SANTA FE
GOLD MOUNTAINS
High Table Lands, no running water
Rio Puerco
Salinas
SIERRA DE JUMANES
Table Lands, with grama grass but no running water
APACHE INDIANS
RIO DEL NORTE
MAP
of the
TERRITORY OF NEW MEXICO,
made by order of
BRIG. GEN. S.W. KEARNY,
under instructions from
LIEUT. W.H. EMORY, U.S.T.E.
by
LIEUT'S J.W. ABERT and W.G. PECK, U.S.T.E.
1846-7.
Scale of Miles

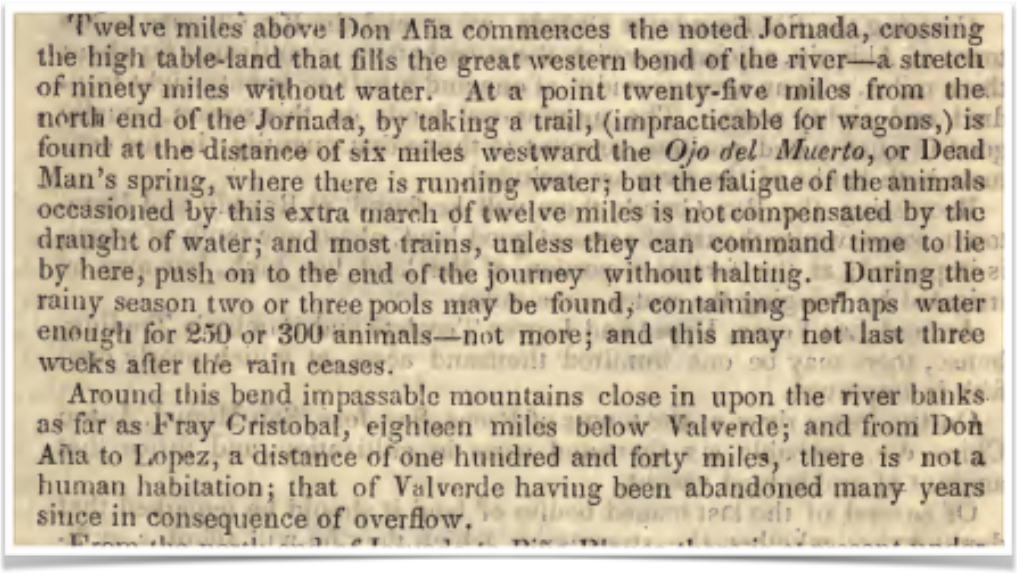
## William G. Peck

**Peck was with Stephen W. Kearny but left the march west to remain in New Mexico, to conduct survey work. He worked primarily in the northern part of the state, and Abert relied on his mapping and studies in that area. Peck and Abert drafted the map on the previous page together.**

## George Archibald McCall

**During 1850, McCall served in New Mexico as a member of the U. S. Army. His "Some Remarks on the Habits of Birds Met With In . . . New Mexico..." was published in the *Proceedings of the Academy of Natural Sciences of Philadelphia, Vol. V*, pp. 213-224. He notes (p.222) that Wild Turkey "was found on almost every stream margined with timber..."**

**His *Report of The Secretary of War, Communicating In compliance with a resolution of the Senate, Colonel McCall's reports in relation to New Mexico*, February 10, 1851, contains an interesting assessment of the territory. An excerpt from the report is shown above, describing the Rio Grande Valley east of the Black Range.**



Twelve miles above Don Aña commences the noted Jornada, crossing the high table-land that fills the great western bend of the river—a stretch of ninety miles without water. At a point twenty-five miles from the north end of the Jornada, by taking a trail, (impracticable for wagons,) is found at the distance of six miles westward the *Ojo del Muerto*, or Dead Man's spring, where there is running water; but the fatigue of the animals occasioned by this extra march of twelve miles is not compensated by the draught of water; and most trains, unless they can command time to lie by here, push on to the end of the journey without halting. During the rainy season two or three pools may be found, containing perhaps water enough for 250 or 300 animals—not more; and this may not last three weeks after the rain ceases.

Around this bend impassable mountains close in upon the river banks as far as Fray Cristobal, eighteen miles below Valverde; and from Don Aña to Lopez, a distance of one hundred and forty miles, there is not a human habitation; that of Valverde having been abandoned many years since in consequence of overflow.

**"Report of The Secretary of War, Communicating In compliance with a resolution of the Senate, Colonel McCall's reports in relation to New Mexico", February 10, 1851, p. 7.**

**His report was focused, primarily, on two topics. The first was an assessment of the agriculture of the territory and the possibilities of increasing agricultural production. The second was an assessment (generally hostile) of the indigenous tribes, the number of warriors, their disposition etc. - and what it would take to "reclaim" or subdue them. The latter part of the report was a cold, hard assessment of what it would take, militarily, to "civilize" the land, with or without the indigenous peoples.**



**McCall in about 1862**

## Samuel Washington Woodhouse

**During 1850-51, Woodhouse was a member of a U.S. Army expedition, the Lorenzo Sitgreaves Expedition, which traveled from El Paso to Santa Fe. During this expedition he collected a Scrub-Jay, the species which is now named after him (Woodhouse's Scrub Jay). Among the species which he first described is the Cassin's Sparrow.**



**A daguerreotype of Woodhouse - 1847.**

34TH CONGRESS, 1st Session. } SENATE. { Ex. Doc. No. 108.

# REPORT

ON THE

# UNITED STATES AND MEXICAN BOUNDARY SURVEY,

MADE UNDER

## THE DIRECTION OF THE SECRETARY OF THE INTERIOR,

BY

WILLIAM H. EMORY.

MAJOR FIRST CAVALRY AND UNITED STATES COMMISSIONER.

## VOLUME I.

WASHINGTON:
A. O. P. NICHOLSON, PRINTER.
1857

## United States and Mexican Boundary Survey - 1848 - In the Black Range 1851

The Treaty of Guadalupe Hidalgo (February 2, 1848) ended the Mexican-American War and, among other things, required that a joint survey be conducted by the two countries to map the exact location of the new boundary between the countries. Article V of the Treaty stated that the boundary (in what is now New Mexico) ran as follows:

> ". . . to the point where it strikes the Southern boundary of New Mexico; thence, westwardly along the whole Southern Boundary of New Mexico (which runs north of the town called Paso to it's western termination; thence, northward, along the western line of New Mexico, until it intersects the first branch of the river Gila; (or if it should not intersect any branch of that river, then, to the point on the said line nearest to such branch, and thence in a direct line to the same;) thence down the middle of the said branch and of the said river . . ."

The reference document to be used was John Disturnell's map of 1847, shown at the top of the following page. A detail from the map (bottom of following page) shows how this area was depicted on the map. The San Diego crossing (see later) is shown north of Paso, the Mina de Cobre (Santa Rita Copper Mines) is shown south of Socorro and east of the Sierra de los Mimbres (Black Range), the Burro Mountains are shown in approximately the correct area, and the Florida Mountains are shown east of the Sierra de los Mimbres which continue south.

Although the boundary was clarified a bit more in the treaty, there was clearly work to be done in defining it precisely. This "new boundary" is not the same as the current boundary between the two nations. This "new boundary" followed the course of the Gila River for much of its length. Following the completion of the survey, William H. Emory, who was the U. S. Boundary Commissioner at the end of the survey, published a report of several volumes (see links which follow). The natural history of the border region was described by a cadre of naturalists while the border survey was being conducted. The result of the survey of natural history is captured in several volumes of the report. The work of the naturalists carrying out the survey was significant. For instance, more than 2,600 plants were collected on the survey. (The Harvard University Herbaria, alone, holds 669 type specimens from the survey.)

When the significant appointments were being made at the beginning of the survey, Weller (and then John Bartlett) was the U. S. Boundary Commissioner. In a letter to Asa Gray, John Torrey described how Bartlett wanted a "full scientific corps", the general confusion in setting up the staffing, and the possible source of friction between the botanists. In part, that letter reads:

> "Bailey has informed me six weeks ago that he had recommended Thurber of Providence as Botanist to the Survey not knowing anything about Parry. Accordingly I at once wrote to Bartlett informing him about Parry's position and claims to the situation. He replied the appointment had been made. He would retain Parry, as it was his intention to have a full scientific corps. I communicated this to Parry by next steamer. Afterwards I found that a Dr. Bigelow of Ohio had also been appointed Surgeon and Botanist to the Survey. Bigelow was strongly recommended by Sullivant but I think he is not a Botanist. He and Thurber came here to see me. Neither of them, I believe, have the official title of Botanist. The former is Surgeon, the latter a 'computer', but both are expected to do duty as botanists. The commission has left it to themselves to settle the question of botanical rank but Bigelow in his letter writes to Thurber as his assistant. Thurber says he will not play second fiddle to such a poor stick. The commission will certainly have a full staff of Botanists when all three are on the ground."*

Charles Wright was then added to the mix. To whatever degree Bartlett was making the decisions, they were the right ones. There may have been issues between the survey members, but as a package they accomplished a great deal.

There were a number of personnel changes during the survey, resulting from technical disagreements, political machinations, personal desires, and personal conflicts. Emory is the name usually associated with this survey. He was, after all, the U. S. Boundary Commissioner at the end of the survey, and he did write the history. But, in general, he did not focus on naturalist functions during his tenure. Readers who have a desire to know more about Emory may wish to read (in particular) Volume 1 of the report on the survey, his account of his earlier expeditions in the region (see links earlier in this book), and other sources.

Following early survey work in California, in which the boundary from below San Diego to the confluence of the Gila and Colorado Rivers was mapped, the survey work shifted east and began anew from El Paso. (The boundary between the two countries, east of El Paso/Ciudad Juárez was defined, basically, as the Rio del Norte [Rio Grande].)

John Bartlett became the United States Boundary Commissioner at this point, serving in that position from 1850 to 1853. 1851 was the period in which most of the natural history work was done in this area. And, lest the map lead you astray, the area was inhabited by Mexicans, Anglos, and Indigenous Peoples. It was being crossed on a regular basis. (While the survey was being conducted in California, its members had to offer assistance in the form of water and food to several emigrant parties.)

The inaccuracy of the Disturnell map and its incompatibility with portions of the Treaty led Bartlett and Condé to negotiate an agreement on how the boundary would be determined on the ground. Several Americans (then and later) objected to this agreement. Among those who disagreed was Amiel Weeks Whipple who was Acting Surveyor.

> "Whipple had protested against any compromise that would deny the United States the Mesilla Valley to the north of El Paso del Norte. Bartlett, however, felt that the loss of the

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*"Dr. John Milton Bigelow, 1804-1878 - An Early Ohio Physician-Botanist", by A. E. Waller, Vol. 51, No. 4, 1942, *Ohio Archaeological and Historical Quarterly*, Ohio Medical History, 1836-58, p. 325




**1846: John Disturnell: Mapa de los Estados Unidos de Méjico**



town and valley of Mesilla was not as important as retaining the mineral area of the Santa Rita Copper Mines, east of present day Silver City."*

This boundary survey was quickly made moot by the Gadsden Purchase Treaty of December 30, 1853. That boundary was precisely defined in the Treaty.

Changing protagonists and treaties make for great story telling, but they are, in general, outside the scope of this effort. We focus on the study of natural history done in the Black Range in/about 1851, which was a result of survey work directed by the original treaty.

The "survey" is complicated by its changing scope. The final survey report focuses on the border as defined by the Gadsden Purchase. Most of the drawings depicting the boundary survey reflect work done on the Gadsden Purchase survey. Reports on the natural history of the effort typically capture the efforts made during the several years of the survey.

The reports which flowed from this survey include:

- *Volume 1, Report on the United States and Mexican Boundary Survey*, William H. Emory, 1857, Part 1. This is the overview of the survey and the record of survey activities.
- *Volume 1, Report on the United States and Mexican Boundary Survey*, William H. Emory, 1857, Part II (Two). This is the record of the geology and paleontology findings.
- *Volume 2, Report on the United States and Mexican Boundary Survey*, William H. Emory, 1859. This report covers the "Botany of the Boundary" (Part I).
- *Report on the United States and Mexican Boundary Survey*, George Englemann, 1859. This volume covers the "*Cactacea of the Boundary*".
- *Report on the United States and Mexican Boundary Survey*, 1859. This volume covers the "*Reptiles of the Boundary*" (by Spencer F. Baird) and the "*Ichthyology of the Boundary*" (by Charles Girard).
- *Report on the United States and Mexican Boundary Survey*, 1859. This volume covers the "*Mammals of the Boundary*" (by Spencer F. Baird) and the "*Birds of the Boundary*" (by Spencer F. Baird).

The major figures of the survey (except Bartlett) were honored by having species named for them. There is *Dalea emoryi, Acacia schottii, Cereus roetteri, Carex thurberi, Saxifraga parryi, Baccharis bigelovii,* and *Mammillaria wrightii,* for example, and there are many other examples.

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* *Survey of the United States Mexico Boundary - 1849-1855 - Background Study*, Lenard E. Brown, U. S. Department of the Interior, Division of History, Office of Archaeology and Historic Preservation, May 1, 1969. This is one of the better, and perhaps most balanced, histories of the Survey.

## William Hemsley Emory

To fit the chronological order of this survey, the two times Emory was in this area are treated separately. His time with the Army of the West was addressed earlier; here we discuss his time with the Mexican-American Boundary Survey. He started his work with the Boundary Survey as the Surveyor, replacing Andrew Belcher Gray. He later became the U. S. Commissioner of the Survey, and it is under his name that the report (the various volumes listed above) was issued. His support of the natural history function of the Survey was primarily one of administration rather than the performance of personal work.

By the time that Emory replaced Bartlett, most of the political turmoil and interference had been reduced and the survey was able to proceed with relative efficiency. Emory is often given credit for "getting things under control", but in truth the politicization of the Survey had run its course by the time he took control of operations.

Whether Emory's willingness to take credit for the work of the expedition was a phenomenon of the times, or of all times, or simply a personal attribute of Emory is difficult to determine - and like many polarized arguments, it was probably both. Emory did not shy away from having his name on the cover of the reports or not adequately recognizing the work of the many dedicated naturalists who worked on the survey.

However, it is not accurate to say that the people who performed the work were not recognized, because many went on to significant roles in other expeditions, in academia, and in other pursuits. However, their contributions were not adequately or publicly acknowledged in the reports of the survey.



The photograph of Emory to the right was taken sometime between 1865 and 1880.

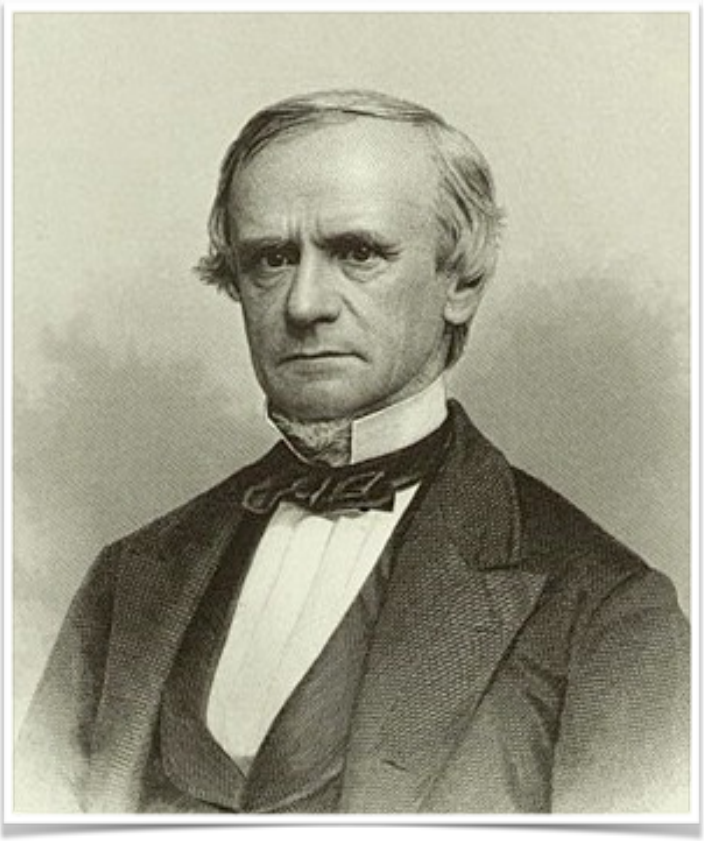
As noted in an earlier entry, Emory was involved in other explorations in and around the Black Range. He apparently collected mammals along the Rio Grande for the Smithsonian in 1853.



**Santa Rita del Cobra (Copper Mines) by Seth Eastman (from a sketch made by others). Sometime between April and August 1851. Camp of the Commission is shown at center left, the village is shown in the middle of the watercolor.**

## John Russell Bartlett and the Giant of The Mimbres

At about Milepost 7 on Highway 61, in the Lower Mimbres, there is a bit of history: A geologic feature, a geologic feature of the type which fascinated in the middle of the 1800's. In the mid-1800's, the Giant of the Mimbres was noteworthy enough to make it into three books about western journeys. Today, it is a feature that we are all too prone to look at and say "that's cool" or "that's nice" and be on our way. Reference to the site today is difficult to come by unless you delve into some professional geological articles. (See discussion and links below.) Even with a name like "Giant of the Mimbres", the fame of the site has come and gone, overshadowed, if you will, by the nearby City of Rocks State Park. The site is referred to as both "Giant..." and "Giants... ". The site appears to be on private land but can be seen from NM 61.



John Russell Bartlett was a historian and linguist of the 1800's. The photograph of him above was taken sometime during the 1850's. Of significance to us is the fact that between 1850 and 1853 he was the United States Boundary Commissioner working on one of the many surveys of the border between the United States (Estados Unidos de Norteamérica) and Mexico (Estados Unidos Mexicanos). In that position he traveled the southwest, pursuing his duties and his love of linguistics. The Commission was moved from El Paso to the Santa Rita Copper Mines in May 1851. (It was cooler there.) On May 1, 1851, Bartlett was camped on the lower Mimbres:

> "May 1st. In camp on the Mimbres. As our animals had been poorly fed since leaving El Paso, I determined to remain here to-day to give them the benefit of the fine young grass. All the party seemed to enjoy the relaxation; and they sallied out after breakfast, some in search of game, others of the picturesque. For my part, I took the two together; for when I went to the hills in search of game I carried my sketch book with me, as it was only among the wooded hills, the defiles, and the thick groves along the river bottom, that game was to be found; and there, too, was the most picturesque landscape scenery, and the best field for the exercise of my pencil. I first walked down the stream about two miles to a thick grove of large cottonwoods. The bottom was much contracted here; nevertheless, it was thickly wooded and forest-like. Ash and oaks were interspersed among the cottonwoods. Saw many signs of turkeys, but shot none myself. Some of the party were more fortunate and brought in several. About five miles north of our camp the river enters the hills, and a little further up, is closely hemmed in by lofty mountains. Noticed wild roses in great profusion, also wild hops, and the Missouri currant. These, in some portions of the valley, were so closely entangled together that it was impossible for one to work his way through. Found several old Indian encampments, with their wigwams standing, and about them fragments of pottery. Many well-marked Indian trails followed the river on both sides, showing that it had been, and probably is now, a great thoroughfare and place of resort for the Apaches. In the afternoon, Mr. Bausman, one of our most indefatigable sportsmen, came in from a hunt, and reported that he had seen some remarkable rocks about five miles up the river, to the north of our camp, which were worth visiting. I immediately had my mule saddled, buckled on my pistols, attached my rifle to the pummel of the saddle, and taking my sketch book, accompanied him to the place referred to, which was about half a mile from the river on the western side. Arriving at the place, I found some singular masses of sandstone standing detached from the adjacent hills, one of them bearing a curious resemblance to a man. My timid mule was much alarmed at the gigantic object which stood before it, trembling from head to foot. We therefore stopped a short distance from it and hitched our animals to an oak which hid from view the source of their terror. Around us stood these singular isolated rocks, some appearing like castles, others like single pedestals and columns. The one resembling a human figure, which is shown in the accompanying sketch, and which I christened the "Giant of the Mimbres," measured but three feet in its narrowest part near the ground; while its upper portion must have been at least twelve feet through, and its height about fifty. Others of equal height stood near. All are disintegrated near the earth, and are gradually crumbling away, several having already fallen. When I had completed my sketch, we mounted our mules, and hastened back to camp, which we did not reach until some time after dark, my long absence meanwhile causing much uneasiness.
>
> Several turkeys were seen during our ride, and a couple shot. A number of fish of the trout species were taken here."

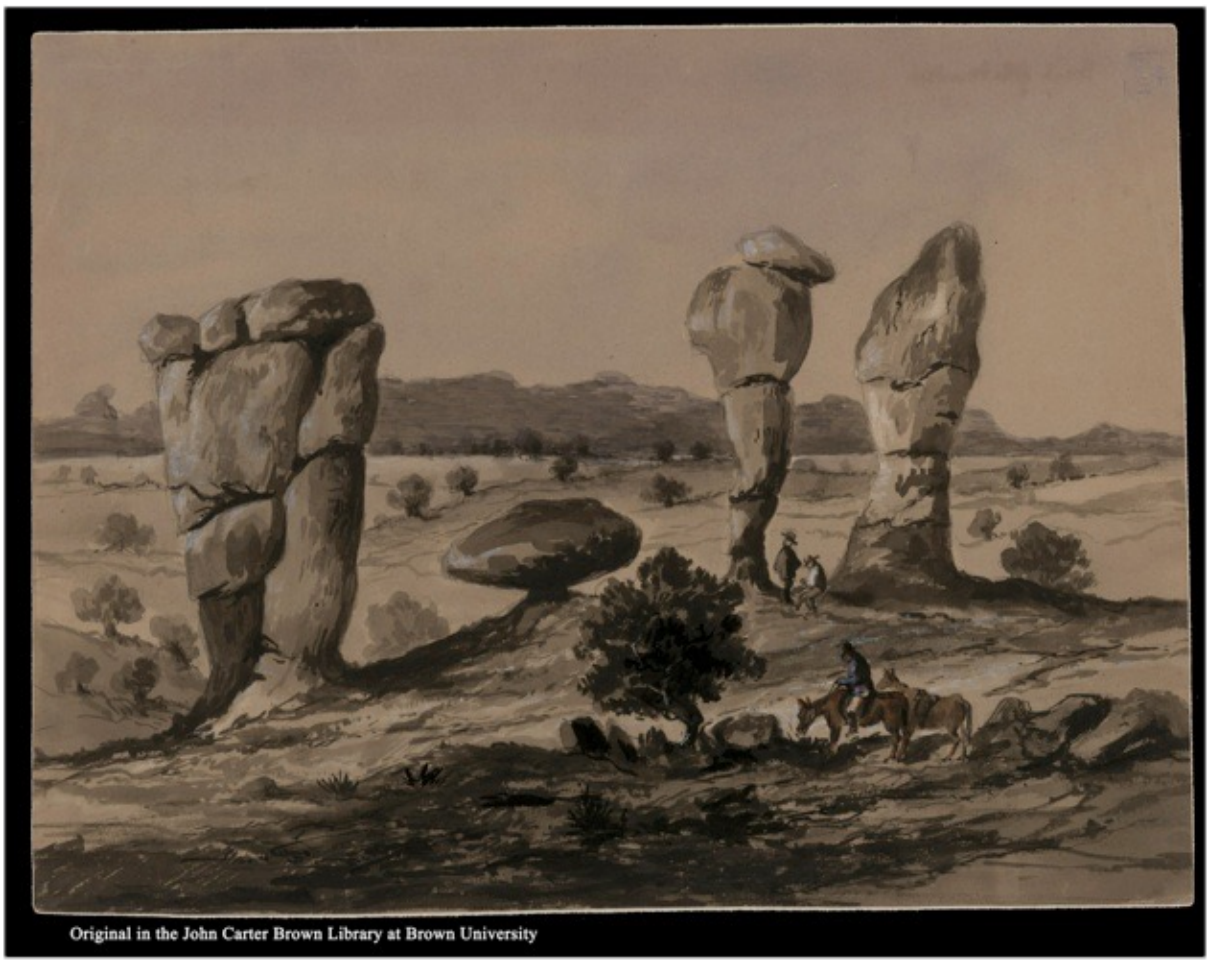
From "*Personal Narrative of Explorations and Incidents in Texas, New Mexico, California, Sonora, and Chihuahua, Connected With the United States and Mexican Boundary Commission During the Years 1850, '51, '52, and '53*". John Russell Bartlett. pp. 222 - 225, report of activities on May 1, 1851.

The lithograph image, at the top of the following page, is from the book referenced above. Bartlett left his archives to the John Carter Brown Library at Brown University.

Among the items left to the University were two images of the Giant of the Mimbres done with "pencil, sepia wash, and color on coarse beige paper". The bottom image on the next page is a "View of rock formations and valley with figures on horseback in the foreground". On the verso is "Giant of the Mimbres" in Bartlett's handwriting. May 1, 1851. (Quoted material from the Luna website of the University.)



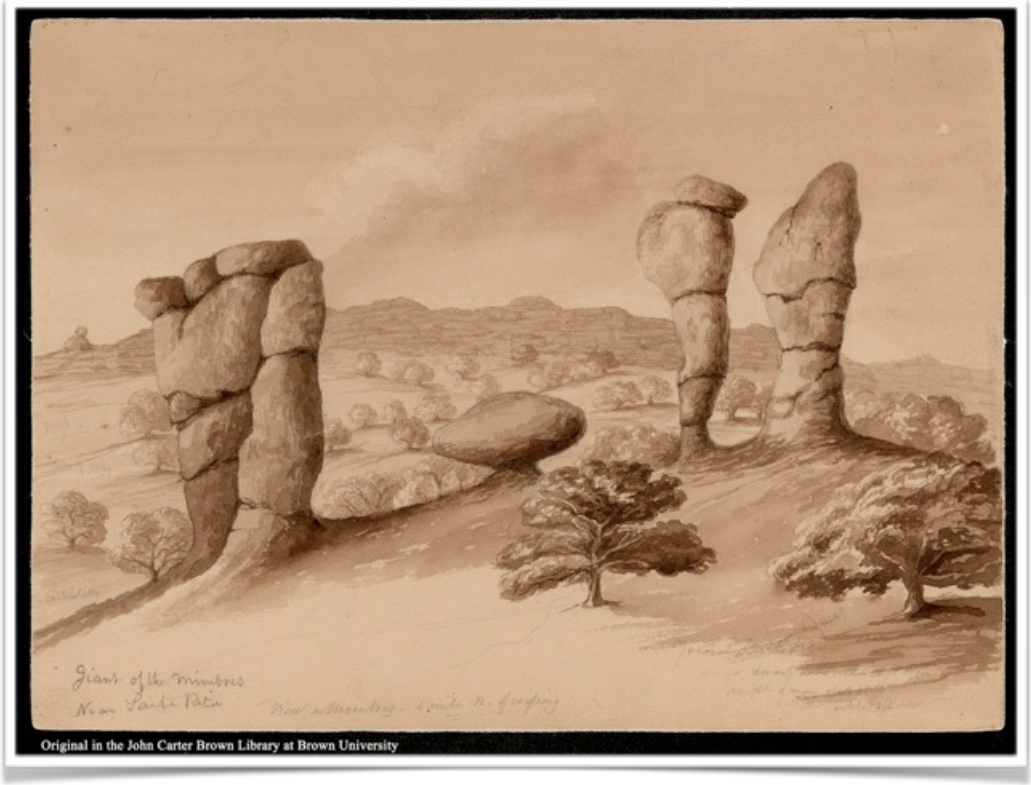
Sandstone rocks, Rio Mimbres.



Original in the John Carter Brown Library at Brown University

| | Miles. | | Miles |
|---|---|---|---|
| From the Rio Grande to Neide's spring... | 40 | From Puerto del Dado to Castro spring... | 3 |
| From Neide's spring to Cooke's spring... | 12 | From Puerto del Dado to Croton springs. | 30 |
| From Cooke's spring to Rio Mimbres..... | 21 | From Castro spring to Croton springs..... | 18 |
| From Rio Mimbres to Agua Fria..... | 15 | From Croton springs to Pheasant creek.. | 12 |
| From Agua Fria to Ojo de la Vacca..... | 6 | From Pheasant creek to Antelope spring. | 3 |
| From Ojo de la Vacca to Ojo de Inez..... | 12 | From Antelope spring to Dove spring..... | 2½ |
| From Ojo de Inez to Valle del Sauz..... | 40 | From Dove spring to Bear spring..... | 16 |
| From Valle del Sauz to Puerto del Dado.. | 23 | | |

In 1857, *Reports of Explorations and Surveys, to Ascertain the Most Practicable and Economical Route For A Railroad From The Mississippi River to The Pacific Ocean, Volume VII* was issued. It contained the report of Lieutenant John G. Parke about railroad route options, entitled *Report of Explorations For Railroad Routes...1854-5*. At page 157, Parke states: "Northeast of 'Agua Caliente'" (ed: Faywood Hot Springs), "between it and the river, is an upheaval of feldspathic porphyry, which has carried up the sandstone strata on each side, which dip northeast and southwest. The upheaval itself presents the appearance of a battery or fortification presenting its semi-circular point to the south. At some distance from this upheaval immense blocks and loose masses of sandstone rock lie heaped together in the most grotesque forms; some of them consist of several masses, one piled on another, and in some instances nicely balanced and ready to topple; seen from a distance, in this highly refracting atmosphere, now they resemble trees, and now men; least of all would they be taken for really what they are, disintegrated sandstones. They are now known as the Giants of the Mimbres. The wearing away of these grits, whitish and yellow sandstone, such as are described near Ojo de la Vaca and the Mimbres, show what a loose texture these rocks have; every heavy shower denudes them to some extent, and after some years they have no longer the same appearance or outline which they formerly showed." At page 188, Parke notes that mineral specimen 87 "sandstone grit, Giants of the Mimbres" was collected. The importance of water sites in western explorations and ventures is epitomized by the careful mapping of water sources and the distances between them, in this report. (See above.)




Left: "View of rock formations and valley with figures on horseback in the foreground". This drawing was never completed (the men and horses were not drawn in) and contains many notes in pencil: on the lower left is "Giant of the Mimbres Near Santa Rita;" in the lower center: "View on Mimbres -- 6 miles n. of crossing;" on the right is "grass, line of oaks, valley;" and on the lower right are "Yucas" and "Yucas and Prickly pear, dwarf oaks, 10 feet high, height of man about 50 ft. Ankle 3 ft." On the verso is "Sandstone Rocks, Rio Mimbres," the title used in Bartlett's Personal Narrative, Vol. 1, p. 224"

The lithograph at the top of the following page is from *New Tracks in North America, Volume 2*, by William A. Bell, plate between pp. 26 & 27. Titled "The City of Rocks", it is actually the Giant of the Mimbres. "There are the valley of rocks, the city of rocks, & c., in which huge masses of sandstone form pillars, chimneys, altars, giant mushrooms, and temples which would compare not unfavorably with Stonehenge, had they not been geological curiosities only. I enjoyed a few hours' photographing amongst these grotesque forms, for they made splendid subjects for the camera." ( p.26) He visited the area in 1867, when he took the



*Giants of the Mimbres, William A. Bell, 1867*

photograph (above) which was the basis for the lithograph in the book (See top of page 53.)

Above, I alluded to modern geologic reports which contained information about these formations. Jerry Mueller & C. R. Twidale's, "Geomorphic Development of the Giants of the Mimbres, Grant County, New Mexico" appeared in *New Mexico Geology* in May 2002 (Volume 24, Number 2). It is an excellent work, containing wonderful photographs and a thorough documentation of the geologic questions associated with the site. The same authors published "Landform Development of City of Rocks and Giants of the Mimbres." (See cover at link for attributions.)

The rock at the Giant of the Mimbres site is Kneeling Nun Tuff, specifically Sugarlump Rhyolite.

The following page shows these formations in 2016. William Bell's photograph of the area, from 1867, is shown above.

There is a significant amount of rhyolite, forming spectacular spires and other forms in this area. Just beyond the High Bridge on NM 152 (two miles west of Hillsboro) there are many spires visible on both sides of the road. These formations are just as striking as the Giants of the Mimbres, but they did not benefit from mention in the publications of the 1880's - too far north to draw the attention of officials from the Boundary Survey. Most of these formations are on private land and are not accessible.

## BARTLETT'S TRIP TO THE MIMBRES

When Bartlett found the formation he was following the same route to the copper mines, from El Paso, that Wright would follow a few months later. Bartlett left Doña Ana on April 27, 1851 and headed north. At noon on April 28 Bartlett's party "reached a new settlement on the river's bank, called Santa Barbara". The inhabitants had just constructed a deep acequia and were flooding and tending their agricultural fields. Bartlett departed Santa Barbara on the 29th and reached Mule Spring at 1:00 p.m. the same day. "This spring is in an arroyo or ravine, and contains a few barrels of water. Some ash and cotton-wood trees mark its course from the mountains where it rises. Colonel Craig, when he passed here with his command a few months before, opened the spring and sunk a barrel in it. The water is very good. In the rainy season, this arroyo is probably filled with water, as the trees and banks exhibit the marks of it."



*Giants of the Mimbres, March 22, 2016*






*From page 219 of Bartlett's account; caption reads - "Approach to Mule Spring - Picacho de Mimbres"*

**On April 30, he left Mule Spring and headed south to Cooke's Spring. "This was directly out of the general course of our route, which was to the north-west; but there was no other way to pass the mountains" (p. 219). They reached Cooke's Spring by 11:00 a.m., finding that "this spring forms a pool, some fifty feet across, surrounded by rushes. The water is a little brackish, but the grass in the vicinity is excellent" (p. 220). That afternoon, they headed west across Cooke's Spring Pass (known by many names). See *The Black Range Naturalist, Volume 3, No. 2, April 2020* for a description of a walk across this pass.**

**They camped on the Mimbres on May 1 (where our description of the Giants of the Mimbres starts - above).**

**On May 2, he visited what is now Faywood Hot Springs, which he simply called *Ojo Caliente* (pp. 225-226) and found them hot. "Mr. Thurber discovered fresh water plants (algae) and insects flourishing in water at this elevated temperature." They also took time to assess the gases they found in the hot water and judged them to be "atmospheric air".**

**Later that day he was kicked by a mule and suffered "a fracture near the shoulder". He removed to the mines where he was immobile for two weeks.**

**"On entering these excavations," (the copper mines) "one sees the bright veins of the sulphuret of copper penetrating the rock in all directions, with here and there small masses of native copper; and it is evident that all the hills in the vicinity are quite as rich as those which have been opened…" (p. 229)**

**In describing the Black Range, he notes, "The principal trees are two species of evergreen oaks; two cedars, one like our red cedar, the other with a berry much larger, and several pines, among them the *Pinus edulis*, or piñon pine. This bears an edible nut, which is a favorite article of food with the Indians. It is quite pleasant to the taste, but is rather small and troublesome to eat." (p. 234)**

**At page 235 he starts his description of the fort at the copper mines (drawing at the top of the following page). There were truly hardships, but there were places to stay and food to eat. And, "The hills and valleys abound in wild animals and game of various kinds. The black-tail deer (*Cervus lewisii*) and the ordinary species (*C. virginianus*) are very common. On the plains below are antelopes. Bears are more numerous than in any region we have yet been in. The grizzly, black, and brown varieties are all found here; and there**

was scarcely a day when bear-meat was not served up at some of the messes. The grizzly and brown are the largest, some having been killed which weighed from seven to eight hundred pounds. These are dangerous animals to approach, unless there are several persons in the party well armed; and even then, it is well to have a place of retreat in case of emergency. I have known a grizzly bear to receive twelve rifle or pistol balls before he fell; though in one instance a huge animal was brought down by a single shot from a well-directed rifle, which passing through his entire length, killed him instantly. Turkeys abound in this region of a very large size. Quails too are found here; but they prefer the plains and valleys. While we remained, our men employed in herding the mules and cattle near the Mimbres, often brought us the fine trout of that stream…." (p. 236)

These descriptions are reasonably apt. When members of the Lewis and Clark expedition first encountered Grizzly Bears they were in terror. Their musket shots did not seem to phase them.

There are no longer Grizzly Bears in the Black Range; humans wiped them out. There are, however, Black Bears which can weigh up to 400 pounds. (Males average 250 and females average 170.) Black Bears come in a variety of colors; black, brown, and cinnamon.

The black-tailed deer he refers to is the Mule Deer, *Odocoileus hemionus.* Two subspecies are found here, the nominate form, *O. h. hemionus*, and the Desert Mule Deer, *O. h. eremicus*. The synonym (*Cervus lewisii)* which Bartlett refers to is the one given by Peale in 1848. There have been several others.

In a letter dated July 1, 1851, to Secretary of the Interior Stuart, Bartlett described the start of his trip south to Sonora. "The whole region south of the range of mountains which runs about twelve miles south of the Copper Mines is barren desert waste, without a single tree or bush with but three or four springs of water and destitute of grass, saving the parched and dry musquit, some three or four inches high."*

By 1849 the territory between the Rio Grande and San Diego was fairly well known, due to the large number of travelers who were using Cooke's Wagon Road. But that does not mean that travel was easy.

When Bartlett and party arrived at the Copper Mines, James Meyers, who was the Quartermaster, found that the housing at the mines was so "dilapidated that it seems to me to be a greater labor and expense to repair than build houses."**








The photograph of a Black (Cinnamon) Bear, above, was taken along South Percha Creek, east slope of the Black Range, May 26, 2020. The photograph of Pronghorn, below, was taken in the Nutt Grasslands (SE edge of the Black Range), May 17, 2017.

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* Report of the Secretary of the Interior, 32nd Congress, 1st Session, Senate Executive Document 119 (1852), pp. 413-14.

** Letter from James Meyer to Bartlett, dated April 21, 1851.

On May 16, Bartlett's party departed for Sonora. He returned to the copper mines on June 23, 1851, departing again on August 27 for the Gila survey, noting: "Since leaving the coast of Texas we had, except for eight days, followed a well marked and beaten road, practicable for wagons, and which was constantly followed by trains of emigrants passing to California." (p. 355).

## John H. Clark

**1851: Among the type specimens that Clark collected in the Rio Mimbres in 1851, as part of the Survey, was that of *Gila pulchella* (now *G. nigrescens* [Charles Girard 1856] and at one time *Tigoma nigrescens [Girard 1856]),* the Chihuahua Chub, which is known only from the Rio Mimbres in the United States (Plate 34, *Vol. II, Part 2, Report on the United States and Mexican Boundary Survey*. See plate on following page.)**

**Chihuahua Chub was not collected again until 1975 in the Rio Mimbres. There is, however, another population of the species in Chihuahua. In that area it was first collected in 1854 and then periodically (1902, 1903, and 1988).* The Rio Mimbres and the Guzmán Basin were part of the same water system in the past.**

**However, it is believed that by the Pleistocene the two areas were "not consistently confluent." (Distribution and Status of the Chihuahua Chub (Teleostei: Cyprinidae: Gila nigrescens), with Notes on its Ecology and Associated Species, by David L. Propst and Jerome A. Stefferud, *The Southwest Naturalist*, Vol. 39, No. 3 (Sep., 1994), pp. 224-234.)**

**We are not focused on the natural history of this particular species here. Instead, it is worth noting that this species, even before the population was degraded by human activity, was rare and localized. The efforts of Clark (and others like him) were substantial and comprehensive, given the time and resources which were available to him.**

**He also collected mammals at this time. For instance, he collected the type specimen for *Tamias (Neotamias) dorsalis* - the Cliff Chipmunk - at Fort Webster (Santa Rita) in 1851 and what was considered a separate species of bear, the Coppermine Grizzly (*Ursus horriaeus*) at Santa Rita in 1852. Clark was, for a time, the astronomer, commissioner, and surveyor for the U.S. in the Boundary Survey. He was also the surveyor for the Texas/ New Mexico boundary survey (1859).**

1. TIGOMA PULCHELLA, Grd.

PLATE XXXIV, FIGS. 5—8.

SPEC. CHAR.—The head is contained four times and a half in the total length. The mouth is small; the posterior extremity of the maxillar bone not extending as far as the anterior rim of the orbit. Diameter of the eye entering five times and a half in the length of the side of the head. The greatest depth of the body is contained about five times in the total length, of which the caudal fin forms the sixth part. Two rudimentary rays at the anterior margin of the dorsal fin instead of one.

SYN.—*Gila pulchella*, B. & G. in Proc. Acad. Nat. Sc. Philad. VII, 1854, 29
*Tigoma pulchella*, GRD. in Proc. Acad. Nat. Sc. Philad. VIII, 1856, 206.

The scales are sub-elliptical, sometimes irregularly so, with radiating furrows upon their posterior section alone; the lateral line being very much deflexed upon the middle of the flanks.

D 2, 9; A 1, 9; C 4, 1, 9, 8, 1, 3; V 9; P 17.

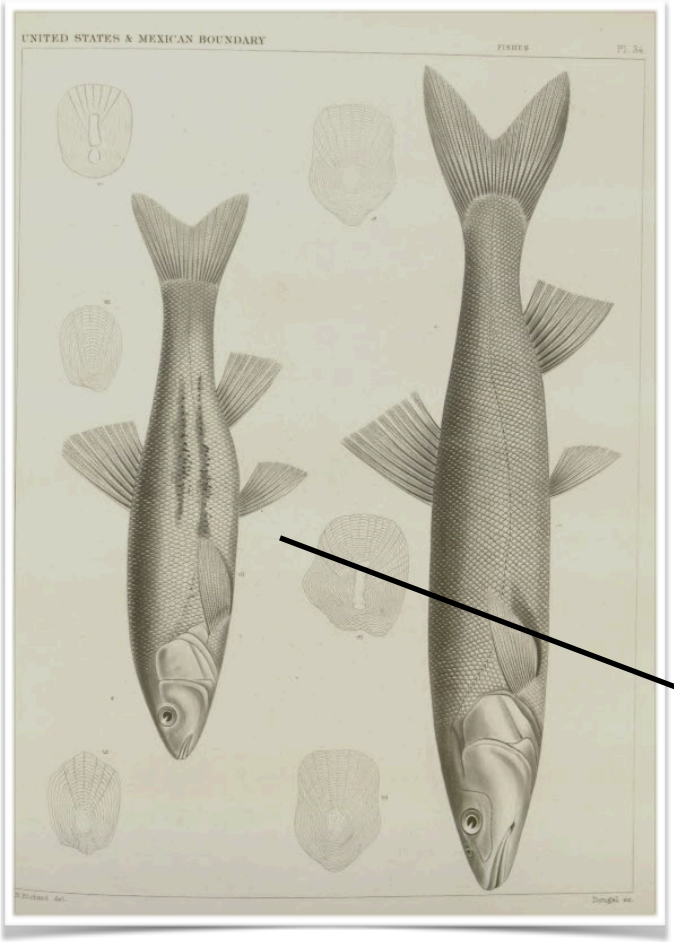
ICHTHYOLOGY. 63

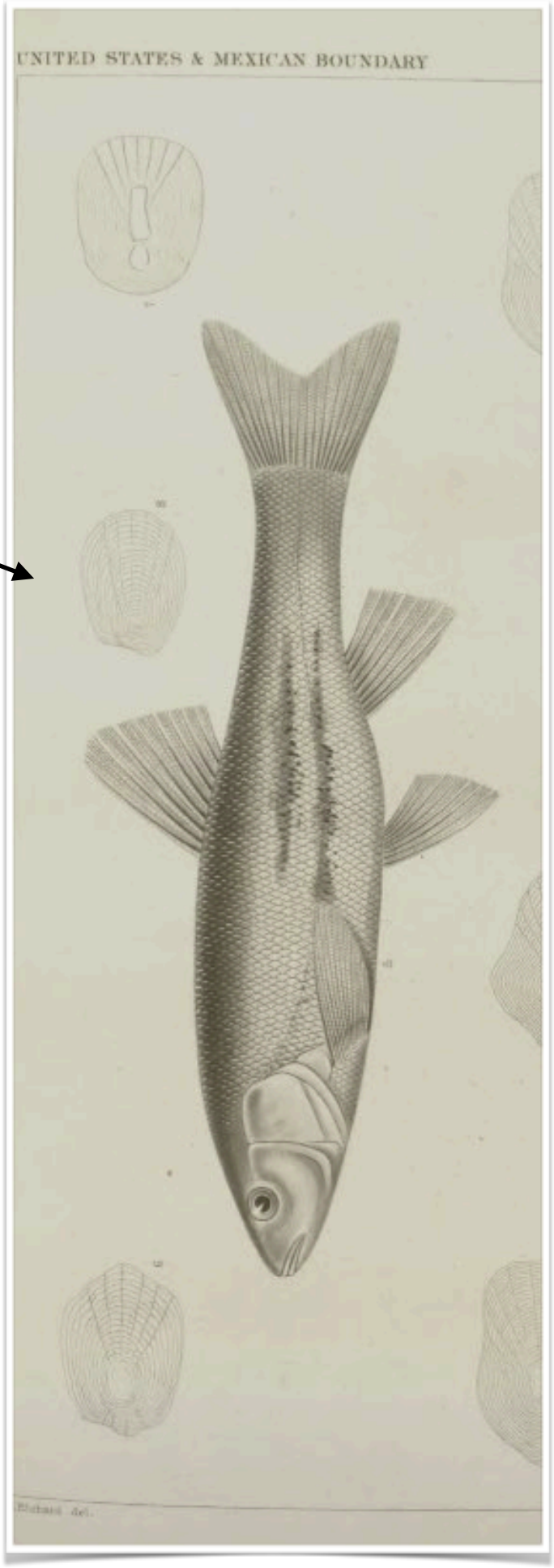
The color is greyish brown above and laterally; dingy yellow beneath.

Plate XXXIV, fig. 5, represents *Tigoma pulchella*, size of life; fig. 6 is a scale from the dorsal region; fig. 7, a scale from the lateral line; fig. 8, a scale from the abdominal region

*List of specimens.*

| Catal. No. | Cor. No. of teeth. | No. of spec. | Locality. | When collected. | Whence obtained. | Nature of specimen. | Collected by— |
|---|---|---|---|---|---|---|---|
| 233 | 2787 | 2 | Rio Mimbres, tributary of Lake Guzman, Mexico. | 1851 | Col J. D. Graham. | Alcoholic .. | John H. Clark ... |



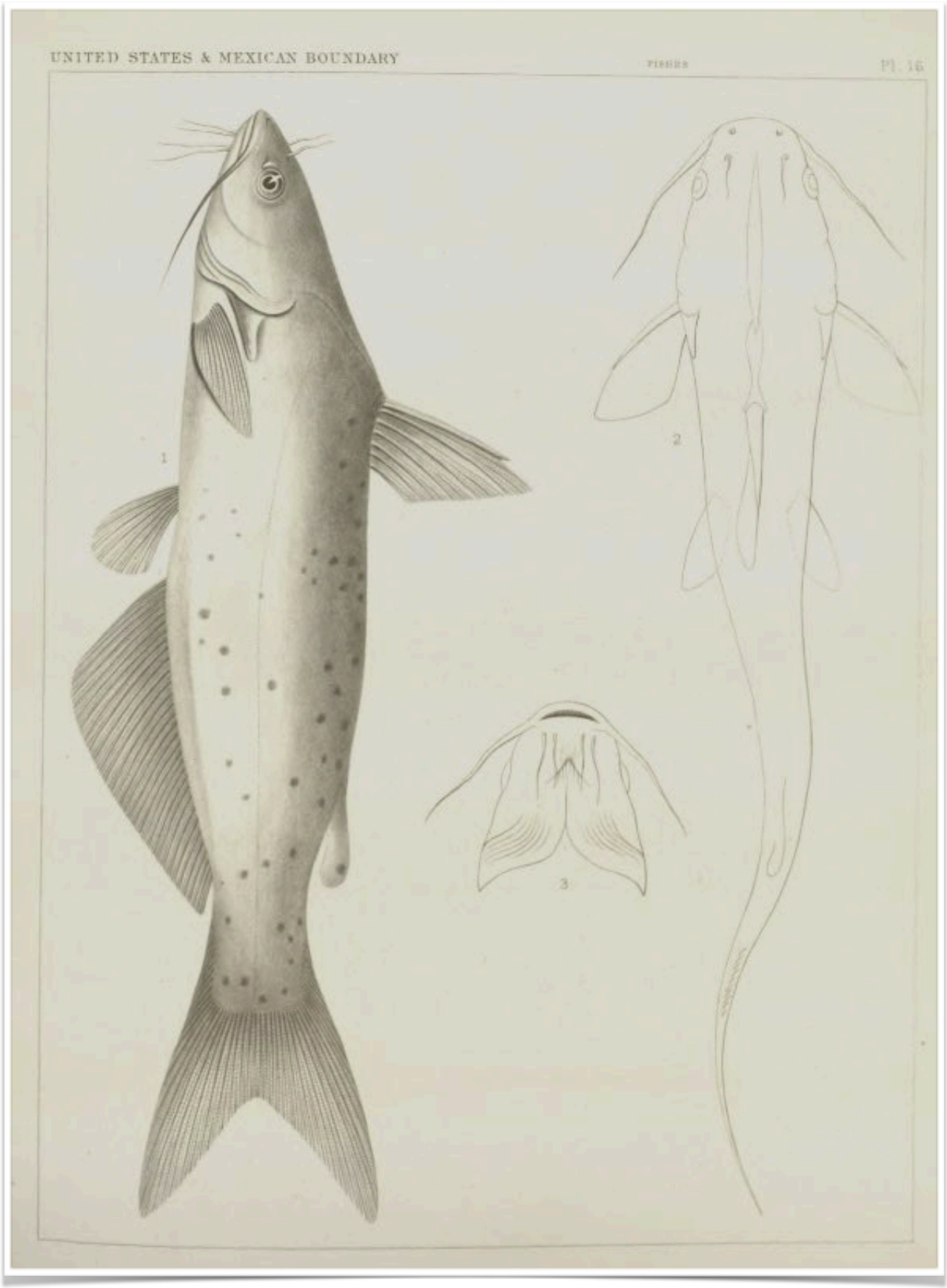




"Descriptions of New Species of Fishes Collected in Texas, New Mexico and Sonora, by Mr. John H. Clark, on the U. S. and Mexican Boundary Survey, and in Texas by Capt. Steward Van Vliet, U. S. A.", by F. S. Baird and Charles Girard, *Proceedings of the Academy of Natural Sciences of Philadelphia*, Vol. 7, 1854-1855, pp. 26 - 29, lists some of the species that Clark collected in the Black Range. See following plates:

- *Pimelodus affinis* (see following page) at page 26 (from the Rio Grande);
- *Catostomus plebeius* at page 28 (Rio Mimbres); and
- *Gila pulchella* at page 29 (Rio Mimbres).

## Issac Sprague

Sprague, who did not serve on the survey worked with Asa Gray for many years and did the botanical illustrations for many of the reports on the western expeditions which Gray was involved in writing. Although not attributed, a number of the drawings in the "Botany" volume of the survey report are thought to have been done by Sprague. While working on the Missouri River, he and John James Audubon discovered a pipit which was later named for him, Sprague's Pipit.




***Pimelodus affinis*, described by Baird and Girard 1854, collected by John H. Clark in the "Rio Grande del Norte". Now considered *Ictalurus furcatus* (Blue Catfish or Blue Channel Catfish), it was first described in 1840 by Valenciennes. Clark collected the specimen depicted here while part of the U.S. and Mexican Boundary Survey of 1851. He also collected the type specimen of *Catostomus clarkii,* the Desert Sucker (Plate 27, Vol. II, Part 2, Report on the United States and Mexican Boundary Survey), which is found in the Gila and the type for *Catostomus plebeius*, the Rio Grande Sucker. Baird's official description of the latter indicates that Clark collected it in the Rio Mimbres.**






## George Thurber

**1851: George Thurber was assigned to the United States and Mexican Boundary Survey of 1848 as a botanist. In that capacity, he collected many specimens (including type specimens) which were formally described by Asa Gray. An account of his activities has to be cobbled up from the specimen listings in the "Botany" volume of the survey report.**

**The specimen sheet shown to the right is not listed as a lectotype for *Robinia neomexicana*, New Mexico Locust, but it was collected in May 1851 by Thurber. The official lectotype was collected from the "dry hills on the Mimbres, New Mexico, May 1851".**

**The photograph above was taken in Railroad Canyon of the Black Range during July 2017. Following the Silver Fire of 2013, New Mexico Locust grew back quickly and aggressively. Many a cut and poke was experienced by hikers in the years immediately following the fire.**

**Like that of many other collectors, Thurber's work in this area is limited to specimen listings - and they are extensive. His collection is housed in the Gray Herbarium at Harvard University. Following his work on the Boundary Survey he returned to the East and taught at several universities. From 1873-1880 he served as President of the Torrey Botanical Club.**

## Charles (Carlos) Wright

**1851: Charles Wright (photo right) is one of the great botanical collectors of his age. He did substantial work in Texas, New Mexico, and Arizona, as well as Japan, northeast Asia, Cuba, and Haiti. He is generally regarded as one of the "super-collectors" of the 1800's, discovering hundreds of new species. Several plant species have been named in his honor. He worked with, and was recognized by, George Engelmann and Asa Gray.**

**E. O. Wooton reviewed Wright's field notes and specimen sheets and summarized his activities in "Southwestern Localities Visited by Charles Wright", Elmer Ottis Wooton, *Bulletin of the Torrey Botanical Club*, November 1906, Vol. 33, No. 11, pp. 561-566.**

**In 1851-1852, Wright was associated with the United States and Mexican Boundary Survey. He joined Col. J. D. Graham in San Antonio, Texas, in May 1851 and traveled with that expedition to El Paso along the southern wagon road. In July he and Graham left El Paso to join Boundary Survey Commissioner Bartlett at the Santa Rita Copper Mines. On July 28, he was in the Rio Grande Valley at Doña Ana. On July 29, he started west via San Diego and Santa Barbara. San Diego was a river crossing (perhaps 11 miles north of Doña Ana), and Santa Barbara was perhaps another 15 miles north of the crossing. Santa Barbara (founded in 1851, or just before Bartlett and later Wright passed through) was located at the site of present-day Hatch. (Some sources state that it was north of present-day Hatch, which was founded in 1875.) Bartlett describes this section of the trip (leaving Doña Ana),**

> **"...we continued on our course towards the north, and soon struck the great Jornada del Muerto, on the Santa Fe road, which we followed for 9 miles, when we turned off to San Diego, the old fording place".**

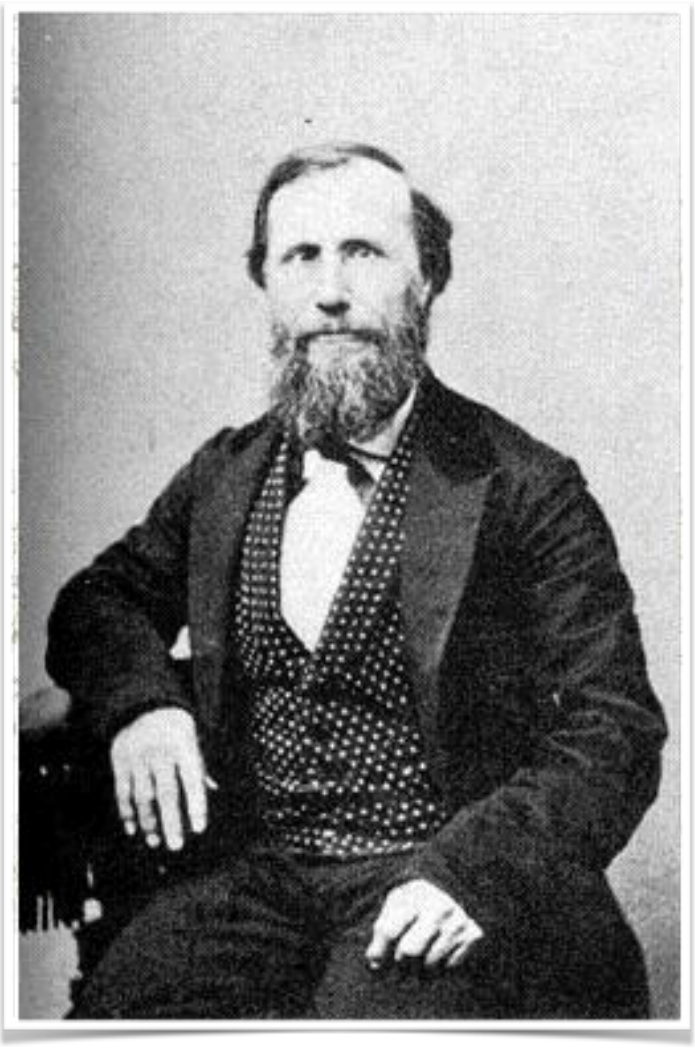
**Earlier, Bartlett's party had crossed the Rio Grande and traveled 8 miles north on the west side of the river, where they camped. From there they traveled north along the river for 14 miles, to Santa Barbara. From Santa Barbara, Bartlett reported that it was 20 miles to Mule Springs.**

**Wright was always collecting. On July 30, somewhere on the "stony hills between Santa Barbara and Coppermines" he collected the specimen of *Eriogonum abertianum* shown on the following page. Note the field number of the specimen (#91). Asa Gray, who compiled Wright's collection from this expedition and published it in *Plantæ Wrightianæ - Texano-Neo-Mexicanae: An Account of a Collection of Plants Made by Charles Wright*... was not always diligent in keeping Wright's specimen sheets and his field note numbers in sync. In this case, he was. Part II of the cited work covers the year 1851.**

**The English common name for *Eriogonum abertianum* is Abert's Wild Buckwheat. It was first described by Torrey in Emory's expedition account, the type specimen being collected in 1847 between the "Del Norte and the Gila".**

***Eriogonum wrightii*, Wright Buckwheat (photo right), also common in this area, was named in his honor by Torrey.**

**From Santa Barbara, Wright travelled to Mule Spring and south from there to Cooke's Spring on July 31.**

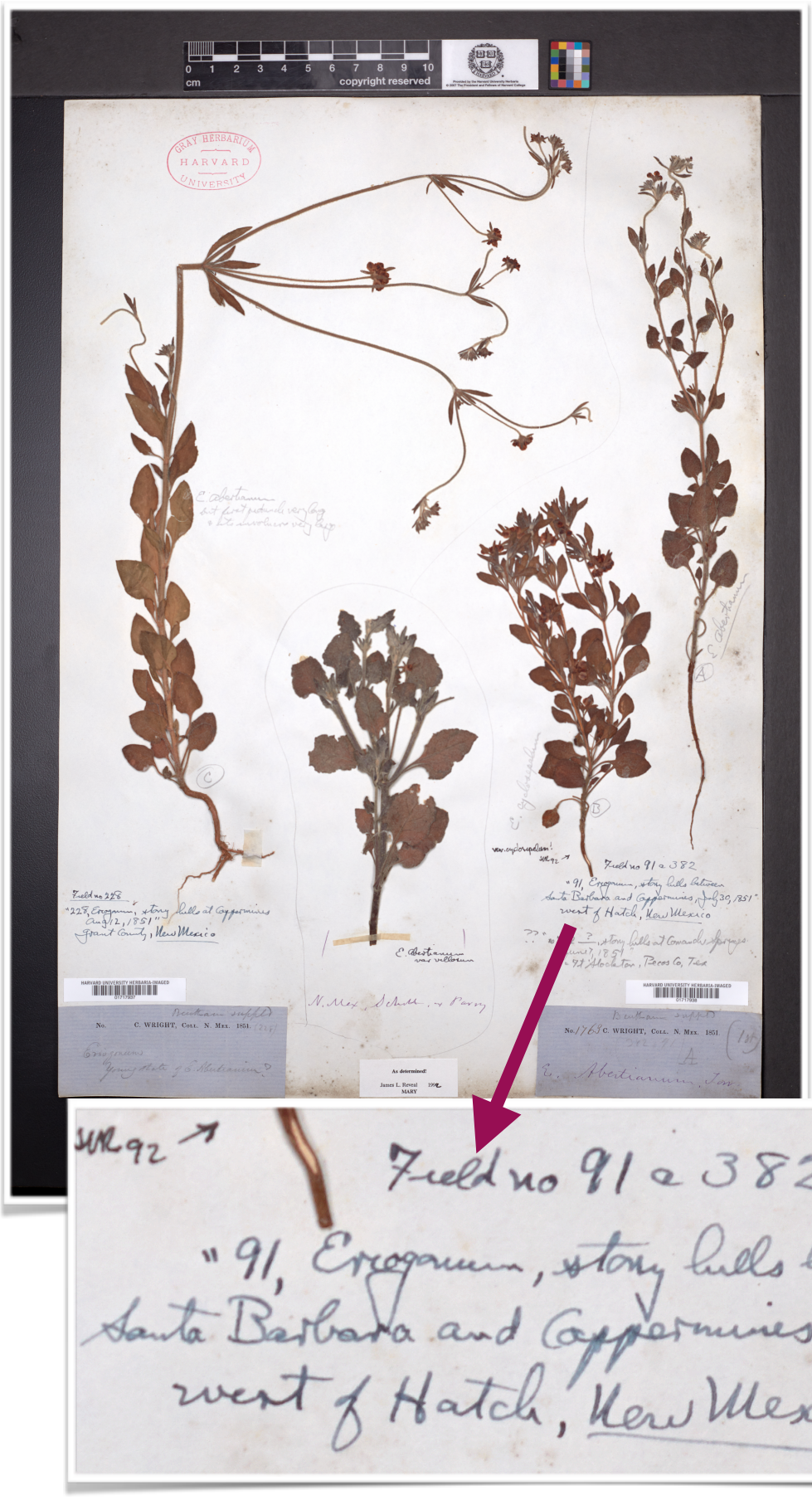


**Both Bartlett in April and Wright in July went to Cooke's Spring via Mule Spring.**

**Fort Thorn was established at Santa Barbara in 1853, and abandoned in 1859. Santa Barbara was abandoned the following year, 1860.**



**On July 4, 1862, Lt. Col. Edward E. Eyer of the 1st Regiment California Volunteer Cavalry, described the route from**







Cooke's Spring to Fort Thorn like this: "July 4, left Cooke's Spring at 6.30 a. m.; took Fort Thorn road, which keeps a north-northeast course, while the Mesilla road turns to the right immediately at the springs and bears east-northeast, passing the Overland Mail Station, which is seen on the hill about half a mile distant. Marched thirteen miles to Mule Spring; good road. Here no water could be found even by digging, having sent a party in advance with spades for that purpose. Left Mule Spring at 12 a. m.; marched twenty-two miles to the Rio Grande, and encamped at 7 p. m. near Fort Thorn. Course, north-northeast and northeast; thirty-five miles. The road for about eight miles after leaving Mule Spring is very good, when it enters a rolling country, the hills becoming more and more abrupt for a distance of about six miles, when it descends into a broad canon, which is followed on a good road to the river. July 5, moved three miles down the river to and reoccupied Fort Thorn; three miles." (*War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies*, published Under the Direction of The Honorable Daniel S. Lamont, Secretary of War, by Maj. George W. Davis, U. S. Army, Mr. Leslie J. Perry, Civilian Expert, Mr. Joseph W. Kirkley, Civilian Expert, Board of Publishers, Series I, Volume L, in Two Parts. Part I, Reports, Correspondence, Etc., Government Printing Office, 1897, p. 125, Letter from Lieutenant Colonel E. E. Eyre, First California Volunteer Calvary at Fort Thorn to Headquarters, Column from California, July 8, 1862.)

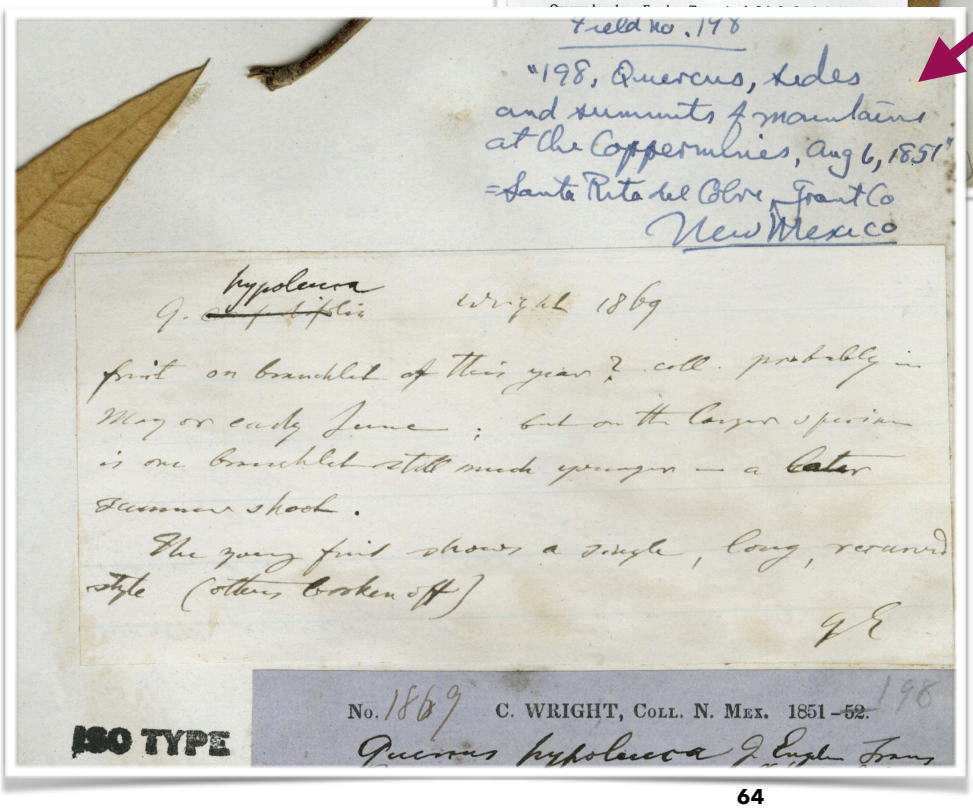
From the Fort Thorne location, Mule Spring is southwest. (To go to Mule Spring from Hatch would require a party to go northwest (passing just east of Cooke's Spring in the process.)

Wright and Bartlett were not traveling through untrodden territory. Harsh and dangerous perhaps, but known. Even so, the area still had not been the subject of extensive scientific exploration. On this trip, Wright was to collect specimens of approximately 50 new species.

On August 1, Wright departed Cooke's Spring and traveled to the Mimbres River, passing the Mimbres Mountains. On the 2nd he travelled from Mimbres to the Copper Mines, where he collected until August 27. From October 9 to October 23 he was, again, collecting at the Copper Mines. On the 25 and 27th he was collecting along the Mimbres River. On November 2 he was collecting around the hot springs (probably Faywood Hot Springs) and then along the Mimbres, then east to Cooke's Spring. On the 3rd he was at Mule Creek and back in the Rio Grande valley by November 4. (*Field Notes of Charles Wright for 1849 and 1851-52, relating to collections from Texas, New Mexico, Arizona and adjacent Sonora and Chihuahua*, transcribed by Ivan M. Johnston, 1940)

His collection from this trip was extensive and is now the basis of much of the botany of the area. On August 6, 1851, he collected what was to become the isotype for the Silverleaf Oak, *Quercus hypoleucoides,* shown here. It was one of many hallmark specimens that he collected that year.

Sometimes we are prone to imagine that traveling with official expeditions made







everything easy. That was not always the case, especially if the expedition was led by military officers. These officers were not always enamored with the hangers-on. Everything depended on the good will of the officer in charge. Wright walked from San Antonio to El Paso, for instance - no favors for the botanist. Wright received ten cents for each specimen he collected.

Wright's legacy is difficult to compare with others because his efforts were often an order of magnitude greater than others. In a time of "greats" he truly was.

SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE.

# PLANTÆ WRIGHTIANÆ

## TEXANO–NEO-MEXICANÆ:

### PART II.

## AN ACCOUNT OF A COLLECTION OF PLANTS

MADE BY

CHARLES WRIGHT, A. M.,

IN

WESTERN TEXAS, NEW MEXICO, AND SONORA, IN THE YEARS 1851 AND 1852.

BY

**ASA GRAY, M. D.,**

FISHER PROFESSOR OF NATURAL HISTORY IN HARVARD UNIVERSITY.

WASHINGTON CITY:

PUBLISHED BY THE SMITHSONIAN INSTITUTION.

FEBRUARY, 1853.

NEW YORK: G. P. PUTNAM & CO.

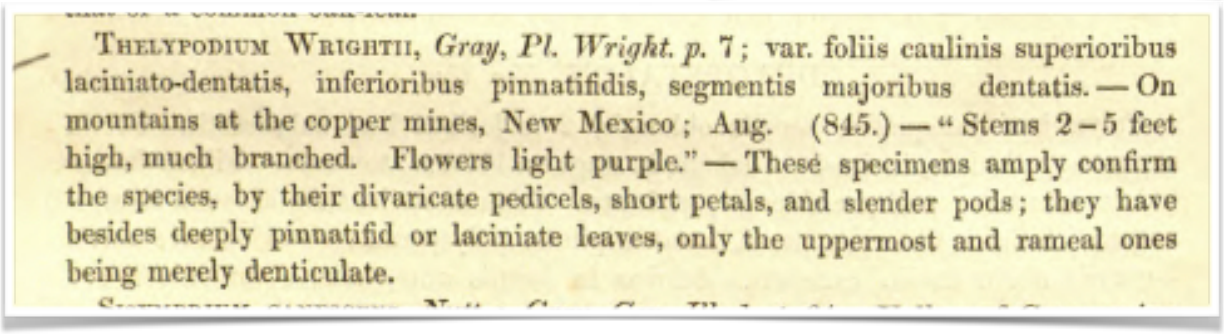
VOL. V. ART. 6.

*We do not use the æ digraph (ligature) much anymore. It is not just pretense, however; it provides guidance on how to pronounce the word. It represents a diphthong, indicating that the sound glides from one to the other within the same syllable.*

# Plantæ Wrightianæ

***Plantae Wrightiane - Texano-Neo-Mexicanae: An Account of a Collection of Plants Made by Charles Wright…*** **is one of the seminal works of southwestern botany. That it would be regarded as such was not lost on Asa Gray. In a letter to Wright on Jan. 23, 1852 he noted that *Plantae Wrightiane* is "the most important memoir I ever wrote . . . and will indelibly fix our names on the Texas-N. Mexican Flora."**

**At page 12 of Part II, Gray describes *Thelypodium wrightii* *(photo gallery)* like this:**



THELYPODIUM WRIGHTII, *Gray, Pl. Wright. p. 7*; var. foliis caulinis superioribus laciniato-dentatis, inferioribus pinnatifidis, segmentis majoribus dentatis. — On mountains at the copper mines, New Mexico; Aug. (845.) — "Stems 2–5 feet high, much branched. Flowers light purple." — These specimens amply confirm the species, by their divaricate pedicels, short petals, and slender pods; they have besides deeply pinnatifid or laciniate leaves, only the uppermost and rameal ones being merely denticulate.

**Wright collected specimens of this species "at the coppermines" (Santa Rita) on August 6, 1851. He had collected the type specimen for this species in Texas in October 1849. The isotype of that specimen is shown on the right side of the specimen sheet shown here. An isotype is a duplicate specimen of the holotype (original specimen) collected at the same time. The plant on the left side of the specimen sheet is the specimen Wright collected in the mountains at the copper mine on August 6, 1851. The photographs of this species, shown here, were taken at the spring at the head of Southwest Canyon in the Black Range (just below Emory Pass on the east slope).**







## John Milton Bigelow

**1851: Bigelow was associated with two of the major exploratory efforts in the American West. He served on the U.S. - Mexican Boundary Survey as botanist and surgeon and later served as the botanist on the Whipple Exploring Expedition of 1853 (Pacific Railroad Route Survey) along the "I-40" corridor. At the end of his life he lived in Michigan, where he was one of the founders of the Detroit Academy of Medicine and served as the Director of the Meteorological Division of the U. S. Lake Survey.**

**He collected the holotype of *Psoralidium bigelovii*, shown below right, at the Santa Rita del Cobre (copper mines) while serving with the Survey. The current name of the species is *Psoralea bigelovii or Psoralea tenuiflora var. bigelovii*. Along the Mimbres, he collected the syntype of *Actinella bigelovii (now Hymenoxys bigelovii*, Bigelow's Rubberweed, shown on the following page.) One mark of a naturalist's renown is the number of species which are named in his/her honor. In the case of Bigelow, there are a lot, including *Gilia bigelovii, Abronia bigelovii, Astragalus bigelovii, Aster bigelovii, Clematis bigelovii, Gentiana bigelovii, Poa bigelovii (*and many more - and these are just some of the type specimens collected in New Mexico*),* but not the genus *Bigelowia* - which was named in the early 1800's in honor of Jacob Bigelow. The fact that a *Bigelowia* genus already existed meant that J. M. Bigelow could not have any of the genera he discovered named after him.**

**At Cooke's Spring, Bigelow collected the isosyntype specimen of what is now called *Linanthus bigelovii*, originally described as *Gilia bigelovii* by Asa Gray, upper right. (A single specimen which is used in the original description of a species is called a holotype. If no holotype is designated, a syntype is a specimen listed in the original description [assumes more than one specimen], and an isosyntype is a duplicate of a syntype.)**

**While on the Whipple Expedition, Bigelow collected the type specimen for what is now called *Dieteria bigelovii*, Bigelow's Tansyaster, in the Sandia Mountains to our north. This was originally described as *Aster bigelovii* by Asa Gray. (See specimen sheet, lower right, on following page.) The photos on the following page are from the Grandview Trail just northwest of Sawyers Peak in the Black Range.**

**And lastly, for our purposes, Bigelow collected the type specimen (specimen sheet at page 69) for *Pedicularis centranthera*, the Dwarf or Great Basin Lousewort, at Ben More (or Ben Moore) near the copper mines. The location name is no longer used.**

**As noted in the introduction to the Boundary Survey entries, the wealth of botanists on the expedition had great benefits, but it was also the cause of certain friction.**

**All of the above speaks to success, but it was not always easy.**

> **"Bigelow had not understood at first that every plant new to him was not a new plant. He had not been aware of Wright's previous collections nor of Parry's successes around San Diego. He was disappointed to learn that some of his collections contained plants already named. . . . When Gray**











The photos of *Dieteria bigelovii* on this page were taken on September 27, 2020 on the Grandview trail in the Black Range.



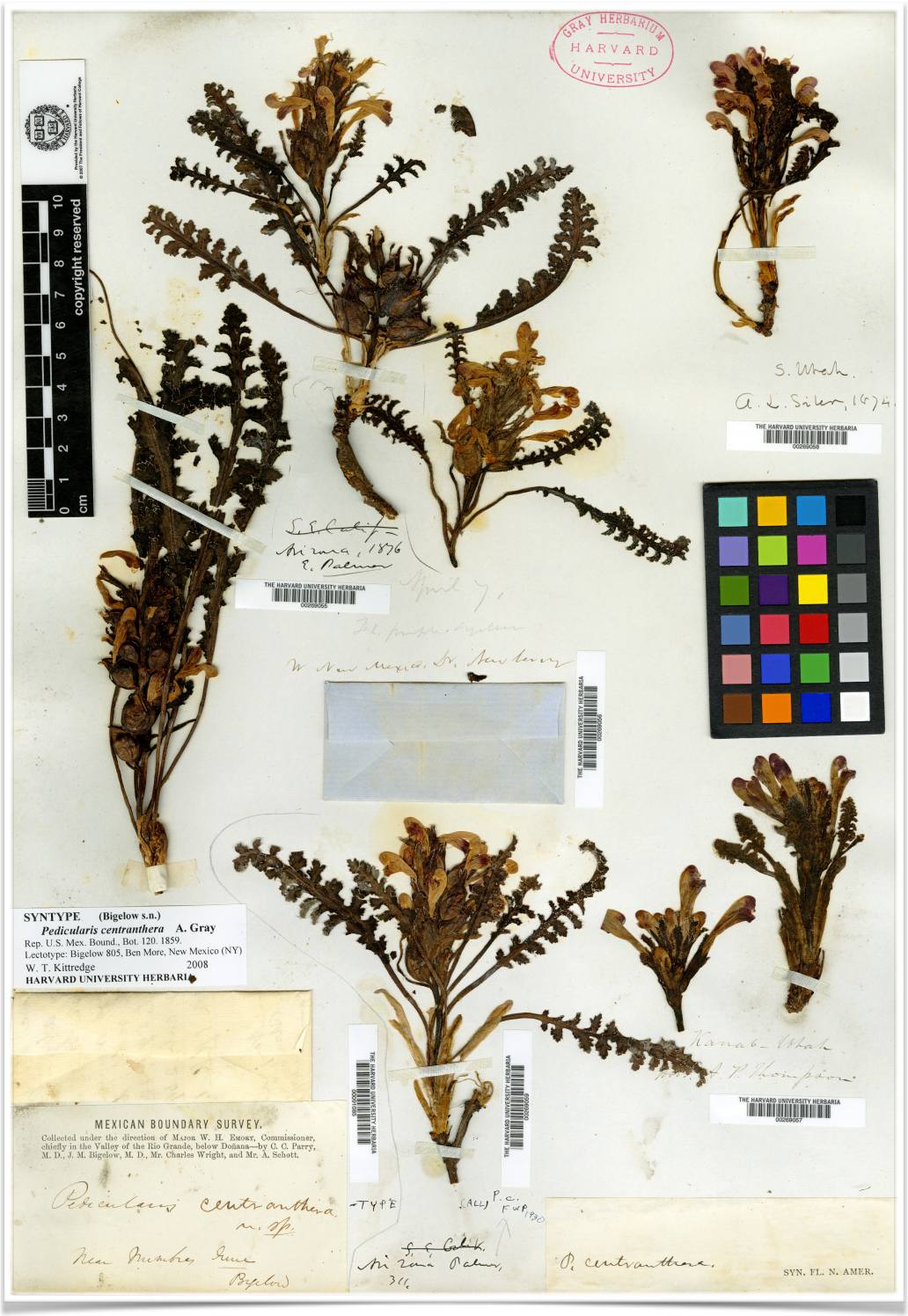




published the *Plantæ Wrightianæ*, Bigelow felt he deserved a larger share of credit and some years afterwards wrote he had been 'Wrightized' out of his plants."*

In April 1853, Asa Wright sent Bigelow copies of *Plantæ Wrightianæ*. Bigelow's response was – frank. A copy of that correspondence dated April 19, 1853, follows. In part it reads:

> "I find in the publication of the second part that you and Mr. Wright have anticipated me in the publication of 30 or 40 new species and among them 3 or 4 new genera which I had collected either before or contemporaneously with him. Clearly all the new plants collected at the Copper Mines (Santa Rita del Cobre) at the Organ Mts near Dona Ana (and) Lake Guzman expedition and those around Frontera and El Paso were collected under the foregoing circumstances. I went to the Copper Mines about the middle of Apr 1851 he did not come until the following July. And Mr. Wright may recollect that Mr. Thurber gave me the right to collect in that neighborhood!!!!" (Ed. "right" is underlined several times in the original - see following page.)




All too often we look back and assume only the best from the people who made the natural history of this place known more than it had been. But they were people: Sometimes they did not get along, sometimes there were misunderstandings, sometimes things got a bit underhanded, and sometimes feelings, reputations, and friendships suffered severely.

Regardless of the merits of his feelings, his expertise was recognized, because when the survey was disbanded and Bigelow had just settled back into life in Ohio, he was appointed to the Whipple Expedition.

And regardless of some of the interpersonal strife that occurred during and after the expeditions in the West, including the Boundary Survey, most of the participants came out of the experience with their knowledge and reputations greatly enhanced.

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*"*Dr. John Milton Bigelow, 1804-1878 - An Early Ohio Physician-Botanist*", by A. E. Waller, Vol. 51, No. 4, 1942, *Ohio Archaeological and Historical Quarterly*; Ohio Medical History, 1836-58, p. 326.

J. M. Bigelow

Lancaster O. Apl. 19. 1853

Dear Sir.

Yesterday I received your Plant. Wright. Parts I & II for which you will please receive my sincere thanks.

I find in the publication of the second part that you & Mr Wright have anticipated me in the publication of 30 or 40 new species and among them 3 or 4 new genera which I had collected either before or contemporaneously with him. — Nearly all the new plants collected at the Copper Mines (Santa Rita del Cobre) at the Organ Mts near Doña Ana Lake Guzman expedition and those around Fronteras and El Paso were collected under the foregoing circumstances. — I went to the Copper Mines about the middle of Apl 1851 he did not come until the following July. And Mr Wright may recollect that Mr Thurber gave me the right to collect in that neighborhood ?!!! The celebrated right of Rights in these cases (that is collecting plants where one pleases) is not very oppressive and I do not wish to contravene it notwithstanding the ampleness of Mr. Thurber! All I claim is is the simple negative merit of not being anticipated in credit by one engaged in the same expedition with

me which you will perceive is done by Pl: Wr:
Several of his plants among which I distinctly recollect Hosackia Wrightii Delphinium Scopulorum Silene Greggii Rubus Neo-Mexicanus Heuchera Rubescens Symphoricarpus rotundifolius Tagetes Micrantha (and probably several others that I can not identify having been entirely new genera to me) I found and collected before Mr. Wright came into the neighborhood. A great many others I found at the same time and in company with him among which I can recollect and may enumerate Dryapetalon runcinatum (Nov. Gen Fig'd) Thlaspi Fendleri Lepidium Wrightii L. intermedium Silene Wrightii Arenaria Saxosa Sphaeralcea Wrightii Glossopetalon Spinescens (Nov. Gen Fig'd) Monnina Wrightii Phaseolus Wrightii Several Dalias Several Oenotheras Several Cucurbitaceae Brickellia Wrightii B. betonicaefolia Pericome Caudata (Nov. Gen) Perityle coronopifolia Psathyrotes scaposa (Fig'd) Calycoseris Wrightii (Nov. Gen Fig'd) and probably many others.
In the distribution and description of these my name is not even mentioned. The hasty excursion to Lake Guzman and Santa Maria in Chihuahua was given us by Maj: Emory at my instance altogether entirely. Every thing we collected there in common is given in Plant: Wright: P. II. yet from it no person would suspect I was there excepting he makes good

use of Spectacles and discovers that Myosurus minimus was gathered by me in that place. So also at the Osgen Mts. the pretty Aquilegia leptoceras I had the year before detected in that locality in seed and sent it home in a letter at the same time our other friends sent their specimens. —

I perceive by the Introduction that you propose "as soon as other engagements will permit to combine the account of the remaining portions (After Comps.) of his several collections along with those of Mr. Fendler and Mr. Lindheimer in one general memoir."

Should you do so without reference to my collections and before mine are published would be an unfortunate continuation of the hardships I have been complaining of. — My first collection, I sent to the Smithsonian Institute with a request that they be given into yours or Dr. Torrey's hands for examination and collocation. All my subsequent ones were sent with the same reference. By you being absent at the time in Europe they were consequently given into the hands of Dr. Torrey. I did not regret it because I was only acquainted with either of you by reputation and I believed that you and Dr. Torrey were so intimately associated especially in Botanical researches that full and complete justice would be done. — Will you have the kindness to excuse my extreme candor and write me at your earliest leisure! With sentiments of the highest regard I am yours. Jno. M. Bigelow

Prof. Asa Gray M.D.




*Report of the United States and Mexican Boundary Survey…William H. Emory, Vol. 1, 1857, p. XVII*

## Louis S. Craig

**Craig was in command of the military escort for Bartlett during the early part of the survey. In 1850 and 1851 he passed by Cooke's Spring with - and in support of - the Bartlett Party. He was killed by U. S. Army deserters in 1852. Fort Craig along the Rio Grande was named in his honor.**

## James D. Graham

**Graham was the original Chief Astronomer on the Boundary Survey. This position was responsible for the actual boundary survey. He disagreed with Bartlett and was removed. Emory was his designated replacement.**

## Charles Christopher Parry

**Parry was associated with many exploratory efforts in the American West. He served on the U.S. - Mexican Boundary Survey between 1848 and 1855 as a geologist and botanist. He was included in Whipple's survey party as botanist and surgeon. He was the first to collect many plant species and had several species and two genera named after him. He studied under Torrey, Gray, and Engelmann. He was later the first person to hold the Botanist position with U. S. D. A.**

Parry wrote the introduction for the Survey's description of the botany of the boundary in the survey report, in which he states:

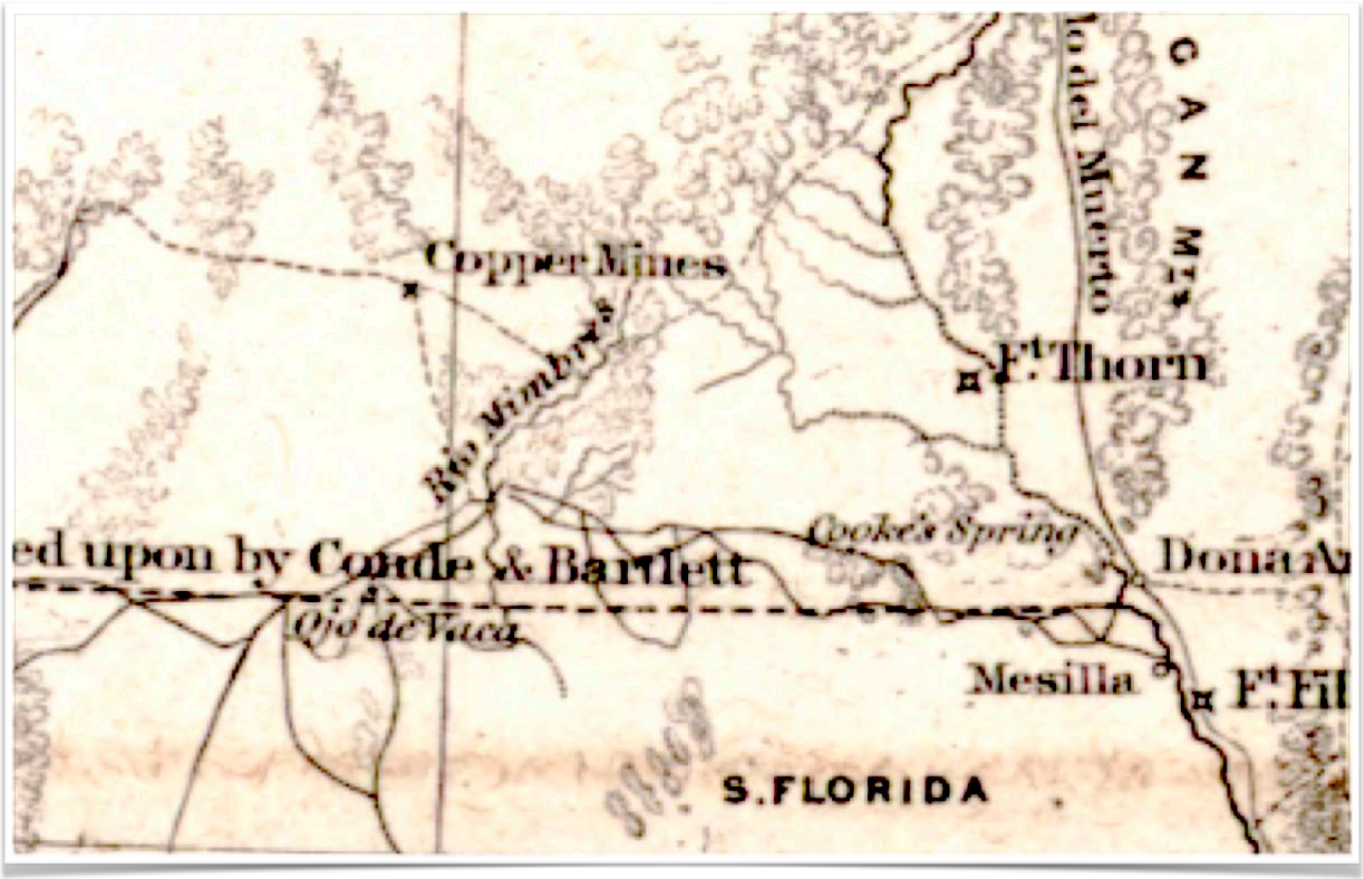
> "The usually difficult task of constructing a phytological map might here be performed with comparative ease, as the observer, little perplexed by a great variety or gradual blending of forms, involuntarily associates particular localities with the predominating and characteristic vegetable productions. Thus one who has ever traversed the desert table lands of the Upper Rio Grande will not fail to unite in his recollection of these tracts the dull foliage of the Creosote bush, the long thorny wands of the *Fouquieria*, the palm-like Yucca, and the crimson-flowered and spine-armed *Cereus*. Still less can any one, who has seen the giant cactus of the Gila in its perfection, ever forget the wild and singular features of the country in which it grows. The distinctness with which the botanical districts are defined gives an unpleasant sameness to the scenery of this country. The extensive plains exhibit a monotonous succession of the same forms, and each mountain slope and ravine presents us a collection of plants quite like those we have so often seen in other and similar localities. Indeed, the botanist in these regions, knowing what to expect in each different situation, soon loses his zeal, and becomes intent upon little else than overcoming space."

Less than an overwhelming appreciation of the diversity of the place.

On November 26, 1852, Parry wrote to Engelmann, giving him an update on his activities. The first page of that letter is shown on the following page and the full document can be accessed at the link. Although Parry wrote the introduction to the volume on botany Volume of the Survey Report he saw himself as a geologist. In the first page of his letter he notes "I was induced to volunteer in its exploration principally with a view to geology." He wrote the geological reports of the Survey with assistance from Arthur Schott.

At page 22 of the Geology Volume, Parry notes:

> "Copper is quite frequently found in connexion with porphyritic rocks. The most usual form of the ore is that of green malachite and red oxide. The locality best known is that of Santa Rita del Cobre, which was profitably worked about 20 years ago. Analysis of ore from this locality exhibited a yield of 75 per cent, of copper. – (See analysis by Professor T. Antisell.)
>
> No mine of copper is at present worked in any part of the region under examination.
>
> Gold is said to be sparingly found at various localities, in connexion with diluvial deposits, derived from adjacent igneous rocks. It is here met with in a finely disseminated state, and has never yet been found in sufficient quantities to yield a fair return for the labor expended . . ."




Report of the United States and Mexican Boundary Survey…William H. Emory, Vol. 1, 1857, p. XVII (detail)

Rec'd Dec 29.
Ans Jan 15

Eagle Pass Texas Nov 26th 1852

Dr Englemann

Dear Sir: I received your letter of Sept 7th a few days ago, having just arrived here after a long & arduous trip down the Rio Grande from Presidio del Norte, to this place.

You probably know that this section of the Bdy Survey has long been a terra incognita and I was thus induced to volunteer in its exploration principally with a view to Geology and I certainly feel well repaid for all my privations in seeing some of the most singular scenery that I believe the world can offer.

I made on the route a fine gleaning of plants and rather copiously of seeds, in which you will doubtless feel interested serving as they do to give completness to the previous collections of Mesrs Lyon & Wright. I noticed very few peculiar Cacte. and had no means for making the collections I should have wished. in fact since my connection with the Bdy Com on this end of the line I have been on a nearly continuous Campaign generally connected with pack mule train which you know affords very poor facilities for transporting Cacti. I also knew that Mr Wright & Dr Bigelow, who were more stationary were zealously occupied in making copious collections which I am still more glad to learn from since com-




*Eragrostis intermedia*, Plains Lovegrass, collected by C. C. Parry at the Santa Rita del Cobre Mines on October 21, 1851.

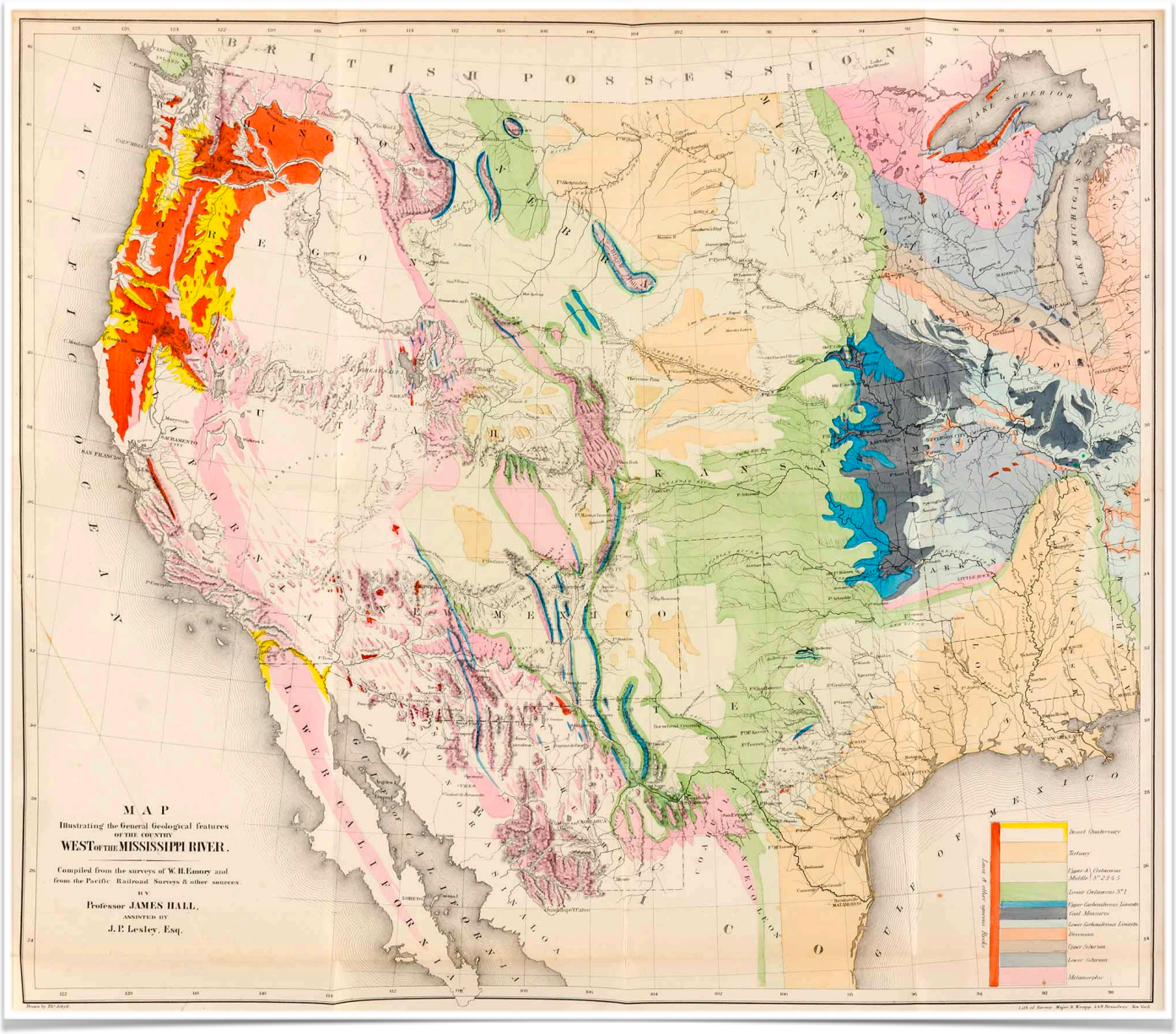
## Arthur Carl Victor Schott

**Schott was a collector, surveyor, and artist who participated in the Survey. Schott had worked with John Torrey, and it was Torrey who recommended him for employment with the Survey.**

**His official role was assistant surveyor and topographical artist. He traveled west with Emory when Emory was appointed the Chief Astronomer, replacing Andrew Belcher Gray (something Gray was very upset about).**

**Schott's drawings of the boundary markers were consider legal documents by the Commission. His drawings were not restricted to this type of documentation and were wide ranging, however. He also collected numerous biological specimens, several of which had not been previously described. Some of these species were named in his honor. Two reptilian species are also named in his honor. One, the Ornate Tree Lizard, *Urosaurus ornatus schottii*, is found in the Black Range. This subspecies is shown on the following page in a photograph taken in Hillsboro.**

**Schott was also active in Texas. See "A Civilian Surveyor on the United States-Mexico Boundary: The Case of Arthur Schott", Paula Rebert, *Proceedings of the American Philosophical Society*, Bol. 155, No. 4, December 2011, pp 433-462.**




**James Hall/J. Peter Lesley's "*Map Illustrating the General Geological Features of the Country West of the Mississippi River: Compiled from the Surveys of W. H. Emory and from the Pacific Railroad Surveys and Other Sources*" appeared in print copies of Volume 1 of the survey report. Much of the information which went into the southwestern portion of the map was based on work performed by Arthur Carl Victor Schott. Emory had all of the field notes and maps burned when the final map of the boundary was produced. His argument was that such notes might confuse matters; of course the opposite is true as well. Emory was not prone to share the credit. The burning of that material fit nicely with his overall perception of his importance to the endeavor.**



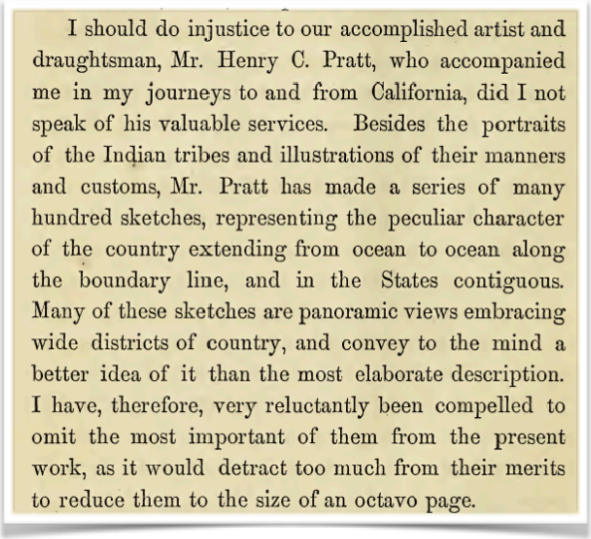
Ornate Tree Lizard, *Urosaurus ornatus schottii*

## Amiel Weeks Whipple

**Whipple's name is frequently heard in discussions about the Southwest, especially in connection with the Joint Boundary Commission of 1848. He was reported to be at Cooke's Spring on June 21, 1851, and at the Copper Mines, thereafter. He was a surveyor and led major surveying expeditions in this general timeframe. He departed the Copper Mines on August 27, leading the astronomical function of the party performing the survey of the Gila. He appears not to have done much natural history work other than cataloguing specific geographic locations.**

## Henry Cheever Pratt

**Although Pratt was an artist, not a naturalist, his renderings are some of the best available from the Bartlett explorations. At least 30 of his illustrations are found in Bartlett's *Personal Narrative of Explorations and Incidents in Texas, New Mexico, California, Sonora, and Chihuahua*. At page "x" (page 26 of the .pdf), Bartlett acknowledged the work of Pratt. (See below.) At the bottom of this page is one of Pratt's paintings from this period, "View In The Canyon of the Coppermines, Santa Rita, New Mexico".**



I should do injustice to our accomplished artist and draughtsman, Mr. Henry C. Pratt, who accompanied me in my journeys to and from California, did I not speak of his valuable services. Besides the portraits of the Indian tribes and illustrations of their manners and customs, Mr. Pratt has made a series of many hundred sketches, representing the peculiar character of the country extending from ocean to ocean along the boundary line, and in the States contiguous. Many of these sketches are panoramic views embracing wide districts of country, and convey to the mind a better idea of it than the most elaborate description. I have, therefore, very reluctantly been compelled to omit the most important of them from the present work, as it would detract too much from their merits to reduce them to the size of an octavo page.

## John James Abert

**At the time of the Survey, John James Abert was the head of the Corps of Topographical Engineers and was involved in many of the key decisions associated with the Survey because of that. The Abert's Towhee was named for his son, James William Abert, who was not associated with the Survey. (See earlier entry on James William Abert).**



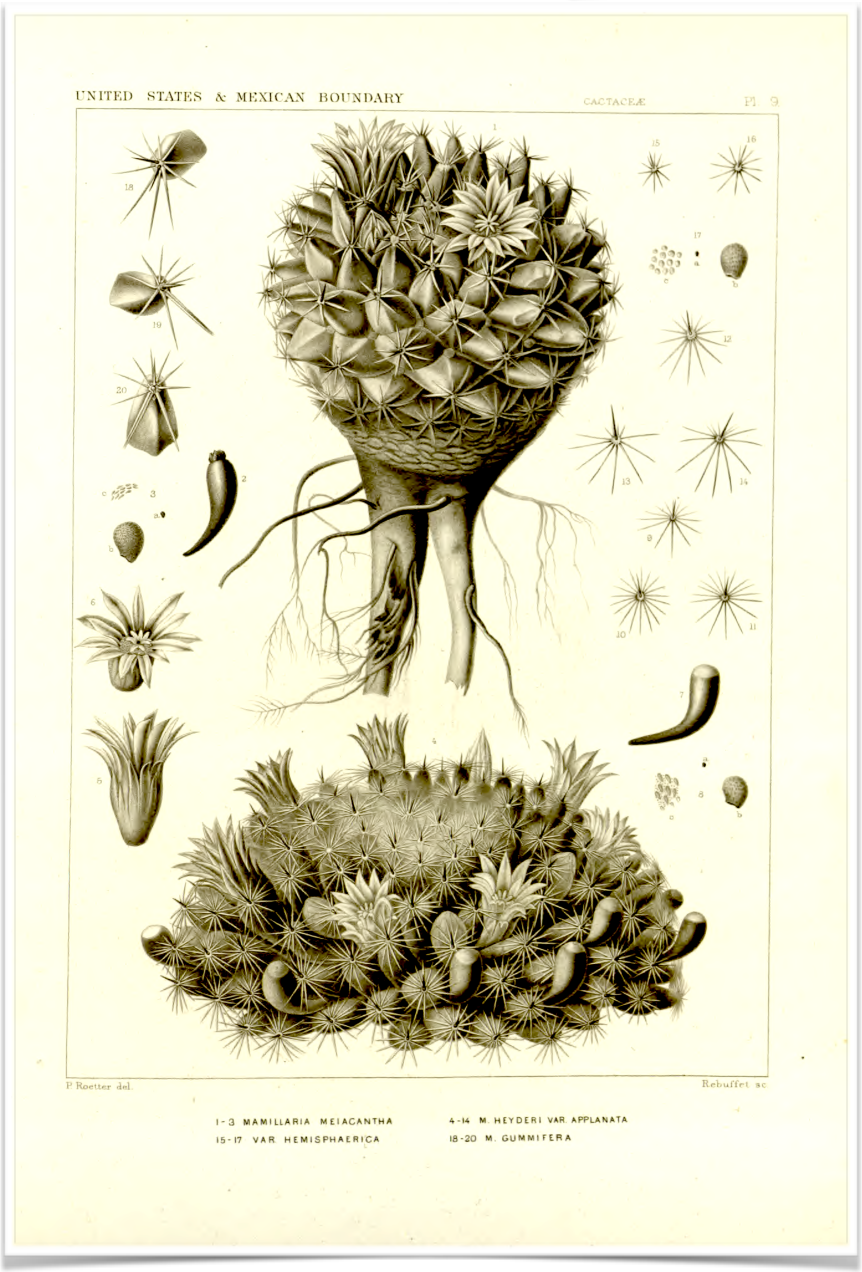
*Henry Pratt - "View in the Canyon of the Coppermines"*

## Paulus Roetter

**Roetter did not serve on the Survey. He was an artist who lived in St. Louis. While teaching at Washington University he met George Englemann. Their association is manifest in the many botanical illustrations which appeared in the various expedition and survey reports which Englemann either wrote or participated with others in writing. In the case of the *Cactaceae of the Boundary* (which George Engelmann wrote), Roetter did 75 of the drawings which appeared in that volume of the Boundary Survey report.**



**Plate 9 of "*Cactaceae of the Boundary*" includes a depiction of *Mammillaria heyderi*, the Little Nipple Cactus (species at the bottom of the plate). This species is found in much of the Black Range at middle elevations from 3,000′ to 6,000′. The photographs shown on this page, and at the link, were taken near Hillsboro, for instance. The photographs of the species in flower were taken in March 2017, others were taken in January of that year.**








**Engelmann (p.9 of the volume) notes that this species "is common throughout the southern parts of New Mexico, and may even extend into Sonora."**

**The plates in this volume are not only accurate, they are gorgeous.**

## Thomas H. Webb

**Webb, the Secretary of the Joint Commission, contributed much to the zoology collection and collected mineralogical specimens as circumstances would allow (pp. viii - ix, Bartlett, *Personal Narrative of Explorations and Incidents in Texas, New Mexico, California, Sonora, and Chihuahua*. )**

**Bartlett had great confidence in Webb's capabilities. Before moving the Commission to Santa Rita (Copper Mines) he sent Webb ahead to assess the area. Webb returned with a full assessment and a recommendation to relocate there. For our purposes, Webb noted that:**

> **"The botanist, there is every reason for supposing, will, in that quarter, find a large and almost unexplored field, a suitable examination of which will undoubtedly amply repay him for all the time and labor devoted to its examination; and the collection of specimens I made, even on this flying trip, convinces me that, by proper explorations and well directed research, a geologist might make discoveries, and with the industry and perseverance that a true love of the science will inspire, might make collections, both geological and mineralogical, that will prove of interest at home and abroad, and be of permanent value to the country." (ibid., pp. 179-180)**

**After leaving the "Giants of the Mimbres", the Bartlett party stopped at what is now Faywood Hot Springs. Bartlett noted:**

> **"This spring lies with a crater-like opening, twenty feet in diameter, on the top of a mound of tufa about six hundred feet in circumference at its base, and about thirty feet high, all of which seems to consist of the deposits made by its waters. The temperature of the water was 125° Fahrenheit. Its surface was some six or seven feet below the rim of the basin, and its depth I judged to be about the same. Dr. Webb collected the gas which bubbled up from the bottom, and found it to be neither hydrogen nor carbonic acid gas. He consequently judged it to be atmospheric air. The water was not unpleasant to the taste, and would be palatable if cooled. Lower down, upon one side of the hill, a small spring burst out, and at a short distance where it collected in a pool, the water was cool enough to bathe in; but even there I found it literally a hot bath." (ibid., p. 225)**

## Seth Eastman/Frank Wheaton/John Bartlett - The tale of a painting

**We stay close at hand and venture far away for this entry. Seth Eastman was a military officer who received his training in drawing at the United States Military Academy at West Point in the 1820's. At that time, drawing was part of the required curriculum at the Academy. That requirement was consistent with education in the country generally. Partly for this reason, it is not unusual to find rather good drawings in correspondence, reports, and diaries of the time. In 1836 Eastman published a book entitled *"A Treatise on Topographical Drawing"* which became a text at the Academy. In it he described a method of optical projection which assured accurate drawings.**

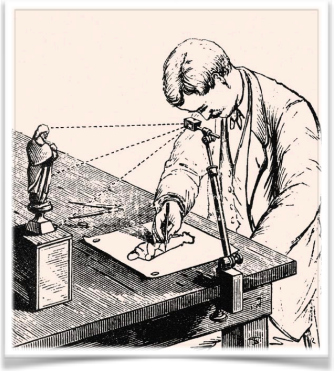


*Great Canyon Rio Gila - 1853 - Seth Eastman*

**Eastman was a famous artist, and his painting of a canyon on the Gila (in Arizona, about eight and a half miles below Coolidge Dam), is both dramatic and well known. If you are familiar with the area you might note that the river is running the wrong way - flowing toward you, instead of away from you. An easy enough mistake if you are working from a drawing and were never at the location yourself, which is the case with Eastman's painting.**

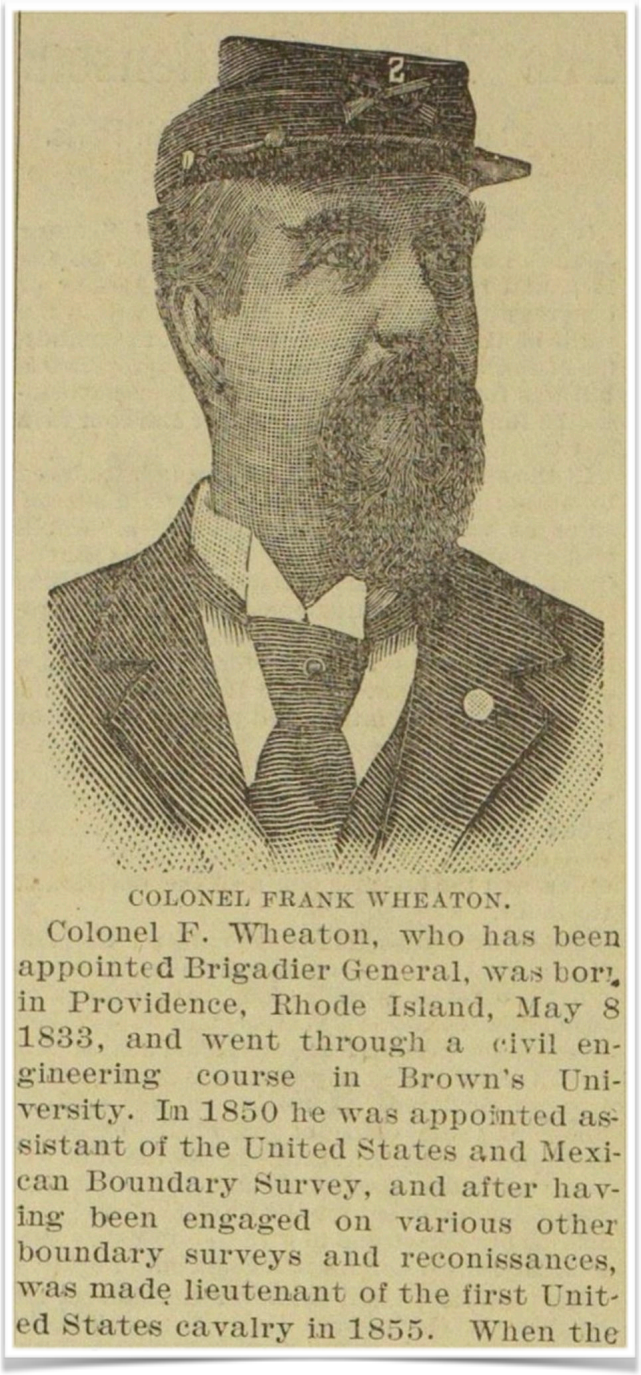
**John Bartlett included a drawing of this location in his field material and hired Eastman to make a painting from the drawing (shown on following page). Bartlett was an accomplished artist and could have made a drawing of this caliber. But he didn't. Bartlett was never at the spot depicted either.**

**Frank Wheaton, who went on to rise to the rank of General and had a distinguished military career, was a member of the boundary survey. He, too, was an accomplished artist. It is he who made the drawing. It is possible that Wheaton used a camera lucida (see right) to help make the drawing. Bartlett had procured one for use in documenting the survey.**



**(The May 2017 issue of *True West* was used as the initial source of information found in this section "*Finding the Great Canyon on the Gila River*" by Tom Jonas.)**





COLONEL FRANK WHEATON.

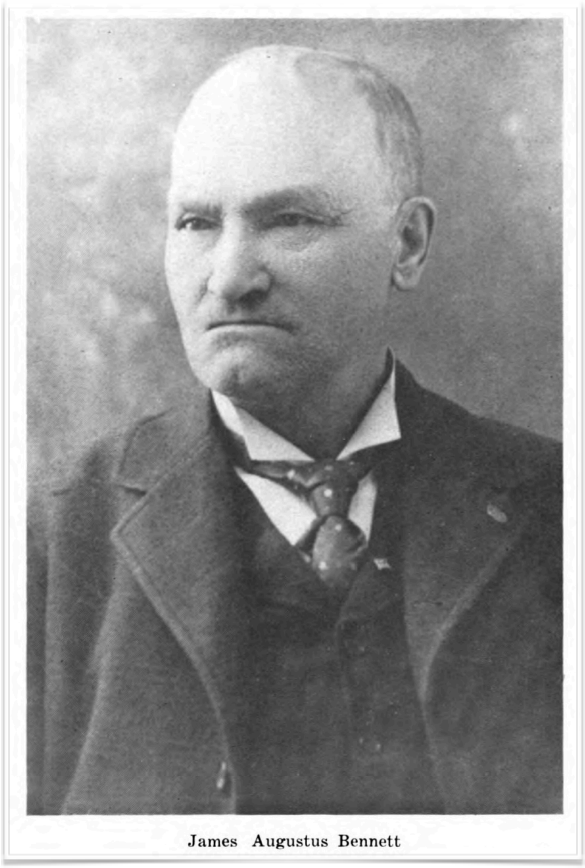
Colonel F. Wheaton, who has been appointed Brigadier General, was born in Providence, Rhode Island, May 8 1833, and went through a civil engineering course in Brown's University. In 1850 he was appointed assistant of the United States and Mexican Boundary Survey, and after having been engaged on various other boundary surveys and reconissances, was made lieutenant of the first United States cavalry in 1855. When the

*Ann Arbor Courier (Ann Arbor, Michigan) May 25, 1892*

**Wheaton was a surveyor, not a naturalist, but like many of his compatriots', his graphic skills were regularly used to document the geologic features, flora, and fauna which were encountered during a survey. These graphic skills were an expected attribute of military officers at the time and did not diminish his perception amongst his peers - quite the contrary. Wheaton went on to a very successful military career and was brevetted as a Major General at the end of the war with the slave states.**

## James Augustus Bennett

**The diary of James Augustus Bennett was edited by Clinton E. Brooks and Frank D. Reeve and published as *Forts and Forays; A Dragoon In New Mexico, 1850-1856*. James Bennett enlisted in the Army in 1849 and served in New Mexico over the next several years. His perspective, that of an articulate enlisted man, was quite different from that of the officers who wrote, or were mentioned, in the official reports. His assignments took him throughout the state. On a few occasions he traveled through the Black Range, visited the Copper Mines, etc. The following excerpts, from his diary, give some insight into the natural history as it was discovered at that time. Bennett was not a naturalist, but his descriptions are often vivid.**



James Augustus Bennett

**Acknowledging different perspectives is an effective way to increase the accuracy of the reporting of any period. Bennett provides an alternative perspective. Along the same lines, Bartlett described differences of opinion about the proper use of alcohol (below).**

**WHEN WORLDS COLLIDE**
**The Many uses of Maguay**

**"June 9th. In camp at Fronteras. The people crowded around us…some to see the doctor…(giving him) bottles of aguardiente…how shocked were the good people when they saw to what base purposes their precious aguardiente was converted. The doctor, although he received the liquor readily enough, had no idea of applying it to the purposes intended by the donors, but used it for preserving his beloved lizards, frogs, fishes, and other specimens in natural history. As it would have been useless to attempt explaining to his patrons his object in collecting and preserving these ill-favored reptiles, they were permitted to rest in the belief that he was making of them some decoction for medicinal purposes." (Bartlett's Personal Narrative, p. 292)**

**At page 34-37 of the link above Bennett begins his description of crossing the Black Range from the Rio Grande and visiting the Copper Mine at Santa Rita (starting on February 18, 1851). See book images below and on the following pages.**



We have 1 Indian, and 1 Mexican as guides with Major Marshall S. Howe[56] in command.

*Feb. 18.*—Came to the head of a deep ravine and commenced the descent about 11 o'clock in the morning. We were in a very narrow passage surrounded by high, abrupt mountains. The Indian guide was in advance. Shots were heard. We immediately hurried forward and found our guide shot through the left hip. The ball had lodged in his saddle. At the same instant we heard shouts of Indians. On getting into a clear spot, 15 Indians were visible but in such a position that we could not get at them. It was the wish of the soldiers to get around them and if possible kill them but the Officer in Command, Major Howe, *having the bump of caution* well developed, objected on the ground that the large body of Indians were on the other side of the hill. We moved on, came to a fine valley and stream called Rio Mimbres. This is a deep but clear stream. The stones on the bottom are visible. These stones have a dark blue color from the appearance of so much copper. The valley was filled with fine black walnut trees which only grow in very rich, fertile soil. We camped. The officers placed their tents in the center. We were all placed at short intervals around the camp to watch. We were all, every man, to be on post during the night. Only think of it! 300 men to watch and guard 5 officers! Oh, that our government only knew the courage of some of her officers! Nothing happened during the night.

*Feb. 20.*—Arrived at the Copper Mines[57] where Fort Webster[58] is located. Not long since the Indians came in sight of this fort and killed one Sergeant and 4 privates, and wounded 3 others. There are 50 men here, all frightened out of their wits. They have old wagons, logs, barrels, rocks, and other articles too numerous to mention, piled around

56. Marshall Saxe Howe entered the army as 1st Lieut., 2nd Dragoons, June 11, 1836. He attained the rank of Major, July 18, 1848.

57. The Santa Rita copper mine was probably worked as early as 1804. Bartlett, *Personal Narrative . . .*, I, 227. Stuart A. Northrop, *Minerals of New Mexico* (University of New Mexico Press, 1942), p. 19. Bancroft, *Arizona and New Mexico*, p. 303.

58. Fort Webster was established in 1851 about eight miles east-northeast of the Santa Rita copper mine to check the Apache. Bender, "Frontier Defense . . . ," 267. Calhoun, *Official Correspondence*, p. 433.



their fort, making it almost impossible to get to it. Their cannon is placed on top of the roof which is flat like all the roofs in this country. They expect momentarily to be attacked by the Indians. When they first saw us coming over the mountain, the mouth of their cannon was turned upon us but their fear was turned to joy when they recognized us as soldiers. During the night it turned cold and snowed 3 or 4 inches. Pleasant to be in camp.

*Feb. 22.*—Yesterday the snow melted. We moved on. Passed an old excavation where gold was formerly mined. It is now deserted on account of the Indians. Animals are dying fast. Thousands of Maguey or century plants are to be seen here. It grows luxuriantly in the richest soils and also shows itself in desert places where nothing else except a few stinted spears of grass can exist. Its uses are many. The fiber of the leaf makes a thread and is woven into sacking or made into ropes. Liquor is made from it. The rooty part of the stem is used by the Mexicans in washing. The plants grow about 18 feet high and have flowers on the top. Here grow also all species of Cactus.

*Feb. 23.—Today found fresh signs of Indians. Our* officer *concluded to go the other way!* [The word "officer" was *not* underlined in the text. C.E.B.]

*Feb. 16.*—Came to Rio Gila.[59] The vicinity along this beautiful river is said to be rich with gold. 'Tis a large river which empties into the Colorado, the latter running into the Gulf of California. We rested and fished. Caught a peculiar fish said to exist in no other river. Good eating, too. Today we moved down the river. Found an impediment in the shape of a mountain. Encamped to make a reconnoiter.

*Feb. 27.*—Advanced. The front of the column reached the summit of the mountain. Our officer took out his glass and took observations of the extensive valley. Below us was to be seen cattle grazing, and smoke curling up in one or two places. 'Twas evident Indians were there. After a moment's consideration he turned and gave the command, "Count-

59. The Gila river rises in the Black Range in southwestern New Mexico and flows southwest and west into the Colorado river. For early difficulty in traveling along the Gila see William Elsey Connelley, *Doniphan's Expedition*, (Topeka, Kansas, 1907), ch. XII.

"Mezcal, or aguardiente, is a spirituous liquor of great strength, much more so than our strongest whiskey. It is obtained from the bulb or root of the maguay or Agave mexicana, and is the common alcoholic drink throughout the country. The process of making this liquor is as follows: A hole is first dug some ten or twelve feet in diameter, and about three deep, and is lined with stones. Upon this a fire is built and kept up until the stones are thoroughly heated. A layer of moist grass is then thrown upon the stones, and on this are piled the bulbs of the maguay, which vary in size, from one's head to a half bushel measure, resembling huge onions. These are covered with a thicker layer of grass; and the whole is allowed to remain until they are thoroughly baked. They are then removed to large leathern bags, and water is poured on them to produce fermentation. At the end of a week the bags are emptied of the maguay and its liquor, which, after undergoing the process of distillation, is ready for use.

But the mescal is the least important of the uses to which the maguay is applied...(other drinks)...From the fibres of its massive leaves, which grow to five or six feet in length, and two inches in thickness, is spun a stout thread, which is again doubled, and twisted into ropes. Next, a heavy bagging is made of it, similar to that in which our coffee comes to market. Again, the more delicate leaves are rolled up into balls, and these, on being pounded, form a lather which answers the purpose of soap...used as thatch...eaten by cattle...But there is yet another use to which it is applied, vis., as an article of food. For this purpose the bulbs or roots are baked in the ashes, or in the same manner as for making aguardiente, and the outer skin stripped off. It is then sweet, and rather pleasant to the taste, and is extensively used by the Indians on the Gila...". (Bartlett's Personal Narrative, p. 290-91 - June 8, 1851.)

**One of the most telling descriptions of the grasses growing in the area is laid out on pages 36-37 of the cited work.**

*March 18.*—Easterly course. Left the Rio Gila some days ago. Passed Copper mines. No shoes or boots to be had. Again on the Rio Grande and glad to see it. Today the grass was as high as our heads and accidently it got on fire.

Came rushing on at a tremendous rate. We had merely time to save ourselves by running to the sandy beach of the river. All our provisions, saddles, arms, ammunition, and camp equipage were destroyed. It was an exciting time. 300 guns and several pistols, lying promiscously on the ground, discharged their deadly contents in all directions. No accidents, however, happened. Bad as an Indian fight. The Major didn't seem to enjoy it.

*March 25.*—Arrived on the 19th once more at Valverde. We were without arms, clothes, ammunition, or provisions when we entered Fort Conrad. Drew a new supply from the Quarter Master. Now staying in camp, getting rested from our tiresome expedition. Nothing to do.

**In 1852, at page 43, he was again crossing the Black Range, commenting on the cottonwoods, topography, and hot water.**

*Feb. 10.*—Socorro[53] yesterday. Saw here the former Mexican Governor of New Mexico, named General Armijo.[54] Arrived at Valverde (Green Vale), a very pretty valley from 2 to 3 miles in width and covered with cotton wood trees. Fort Conrad[55] is located here. Here are concentrated 250 men to accompany us.

*Feb. 12.*—Marched. All on foot leading our horses. Our cavalcade consists of 300 men, about 350 horses and mules. Travelling down the Rio Grande. Camped on its bank.

*Feb. 16.*—Sandy roads, no grass, and warm weather cause great complaints over marching. This morning left the Rio Grande. Course due west. Now we have no roads. Camped on a small stream in a deep ravine. The water was very warm. It issues from a hot spring 1½ miles above us.

**In May 1855, Bennett was assigned to Emory as part of the Boundary Survey. At pages 70 and 71 of the cited work he describes the beginning of the trip west. After leaving the Gila he continued on with the Survey to California and then returned via the Gila (page 73). See page images to the right.**

**On May 19, 1855, Bennett notes that he was at Cooke's Spring. Since at least the 1830's, Cooke's Pass (Massacre Canyon) had been part of the established route going west from the Rio Grande. It was well established when the Butterfield Overland Stage starting using it in 1858. It continued to be the primary route through the area until the railroad route was built later in the century. In the 1830's this route was known as the Gila River Trail.**

**The linked work is short, less than a hundred pages of text, but full of insight about the land, the people, and army life. The cynical humor is typical of the enlisted ranks of any army. Where the officers see order and brilliance, the enlisted are likely to see chaos, stupidity, and arrogance. All too easy to dismiss one perspective or the other.**



*May 4.*—Left for a long trip with Commissioners to fix the boundary line between the United States and Mexico. Major Wm. H. Emory is the Commanding Officer. President Franklin Pierce has appointed him commissioner and astronomer to fix the boundary under the agreement with Mexico of 1853.

*May 7.*—Passed Berlin[143] and Polvadera on the Rio Grande. Great vineyard and fruit trees are seen here. At Valverde, men got drunk. I was obliged to tie up 4 of them to keep them quiet.

*May 10.*—Received a letter from home at Fort Thorn. This fort was named in honor of Capt. Thorn, who was drowned in the Colorado River in 1849. Major Emory sent out Dragoons from his camp in California to recover Capt. Thorn's body.

*May 12.*—While crossing the Rio Grande at San Diego[144] on a ferry boat, lost one man and one horse by drowning. Could not recover the body. Took six men of Company B, 1st Dragoons, from Fort Fillmore, making my company 24 strong.

*May 13.*—Arrived at Fort Bliss. Reported to Major Wm. Emory.

*May 14.*—Started. Crossed the river to El Paso, where we were joined by a party of Mexicans under their Mexican commissioner to act on behalf of their government. Put up the monument, 15 feet high, which marks the corner between New and Old Mexico, and Texas.[145]

*May 17.*—Yesterday along the river in the Mesilla valley. Today at Rio Mimbres.[146] This is a delightful spot. It is a deep, clear stream. A fine walnut grove, abundant flowers, and a green bed of grass make this an ideal camp.

143. The reference must be to Belen, a settlement about thirty miles south of Albuquerque.

144. San Diego was about nine miles north from the southern end of the Jornada del Muerto and was the "old fording place" for the Rio Grande. Bartlett, *Personal Narrative . . .*, I, 215.

145. For the official account of this event see Emory, *Report*, I, 26.

146. The Rio Mimbres flows from north to south and disappears south of Deming, New Mexico.



*May 19.*—Last night at Cook's Spring, which is small, being scarcely sufficient to water our animals. We have 49 horses, 88 mules, and 36 head of beef cattle to feed and water. We now have to make our road, as no wagons have ever passed this way.[147] Came to Ojo de Vaca, or Cow Spring.



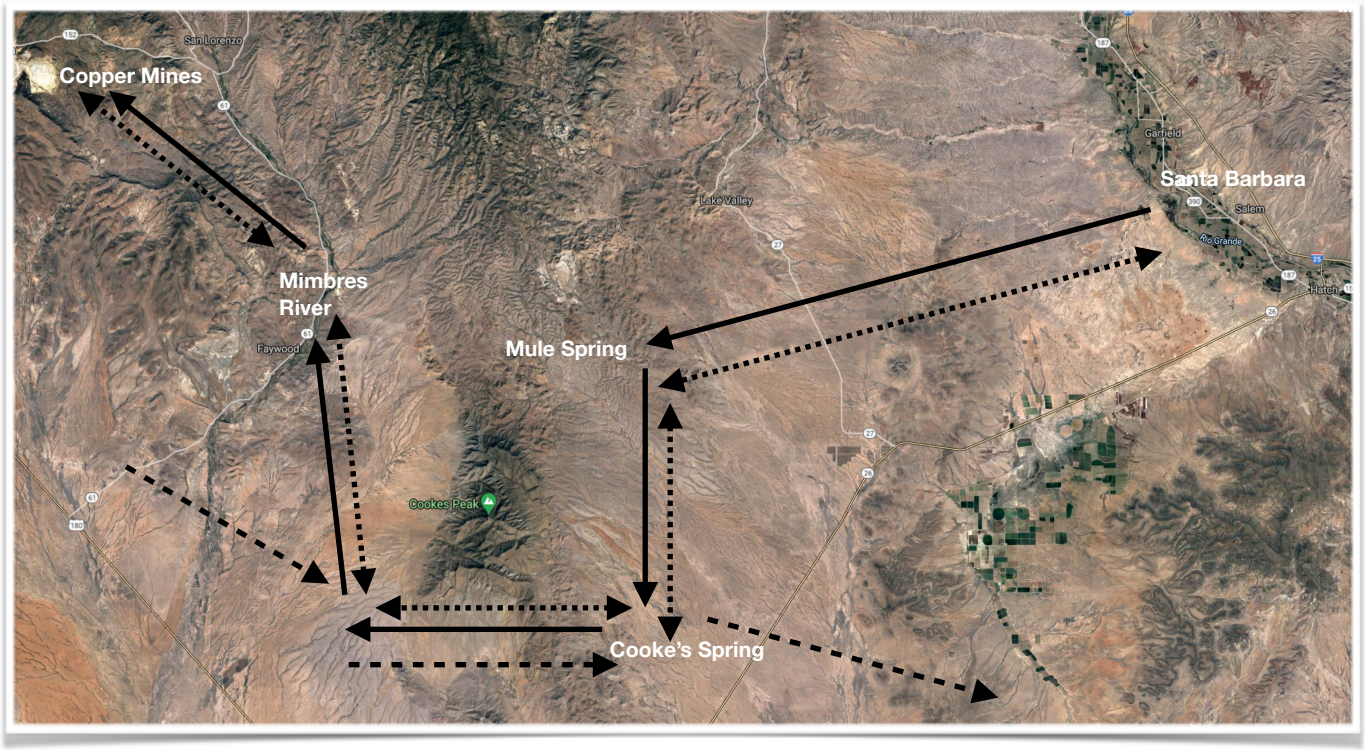
a blanket at night. Came to the mouth of the Gila and went up it. This is the finest country I ever saw, but can not be settled on account of Indians.

*June 14.*—Laid over on Monday to take a rest and catch fish. Yesterday saw a large band of Apaches, who ran from us. We got one of their ponies. Left the Gila and met a party of 70 men going out to look for gold diggings.

*June 15.*—Camped on the summit of quite a high mountain range[154] with a good view of a vast plain, reaching towards the south. This plain is covered with Maguey[155] or Century Plants, growing high into the air.

*June 19.*—Past Copper Mines, near which Fort Webster is located. Also past Rio de las Animos, or River of Spirits, which is about the size of the Gila in this country or the old Genesee River in New York State. Stayed last night on a plain at a small spring. Today arrived at Mesilla,[156] a pretty town which is filled with very pretty women.

*June 21.*—Yesterday crossed the Rio Grande and camped at Fort Fillmore, ending our part of the duties with the boundary marking. The main party remained in the west to complete fixing the line during the rainy season, when they might get enough water to cross the dry waterless plains. We got new shoes and fresh horses here and rested today.




Bartlett party; Whipple is in charge of the Gila Survey work, under Bartlett, and departs the Copper Mines with him, in that effort, on August 27, 1851

Wright, traveling with Col. Graham's party from Santa Barbara to Copper Mines

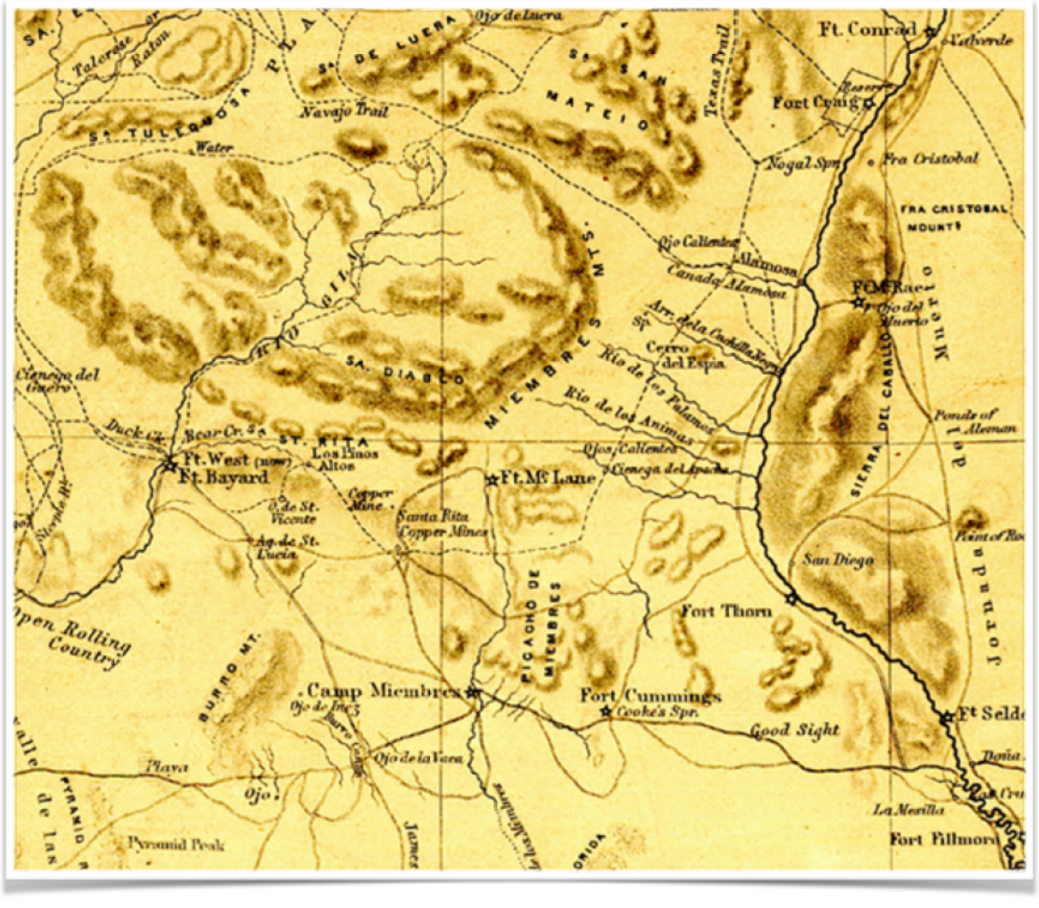
Parke; railroad survey 1854

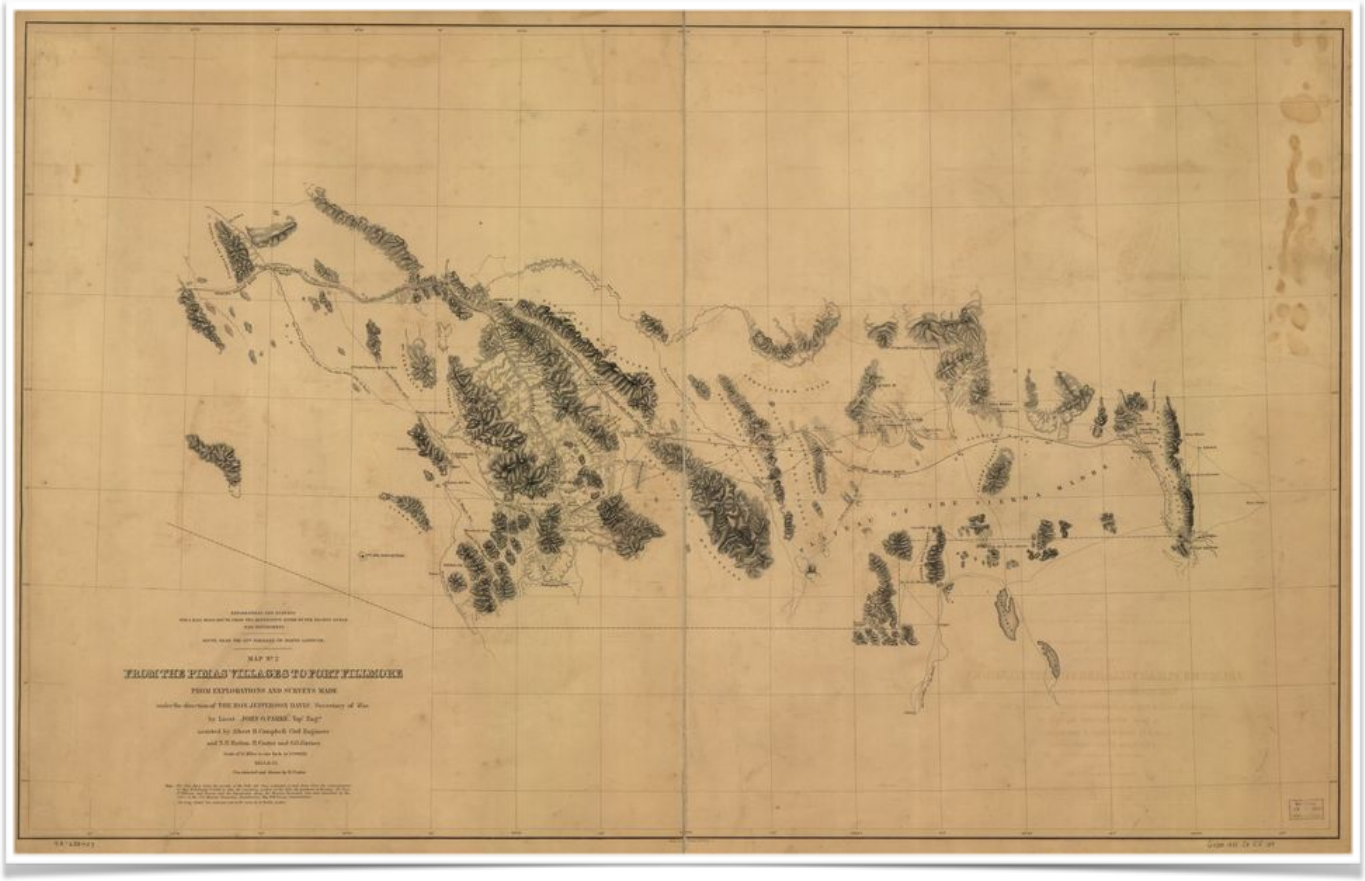



Rand McNally and Company, 1879: Showing the area thirty years later. Note the stage line from Fort Thorn to Cooke's Spring and on to Rio Miembres. This is the route taken earlier by Bartlett, Wright, et. al.




**The map entitled "Old Territory and Military Department of New Mexico, compiled in the Bureau of Topographic Engineers of the War Department chiefly for military purposes under the authority of the Secretary of War - 1859" (above) was partially revised and corrected in 1867, based on a list of authorities including Fremont. Detail below.**






**John G. Parke's map of 1859: "From the Pimas Villages to Fort Fillmore", from Explorations and Surveys. Full map above, detail - showing Cooke's Spring, the Copper Mines, the Mimbres Mountains and Florida Pass - below.**



## John Grubb Parke

**Parke was in the Mimbres valley and crossing the mountains south of Cooke's Peak in March 1854. Parke was surveying a railroad route (see below) as part of the Pacific Railroad Survey under the direction of Williamson.**

**On March 8, he described the Mimbres as about 6 feet wide and 1 foot deep. "The water is clear and cold, and flows over a pebbly bottom, with a rapid current; and, like most of the streams throughout this country, although dignified by the title of rio (river), its waters disappear soon after leaving the mountains, sinking into the sands a short distance below the road." He also commented on the geology of the area and in particular "The Giants of the Mimbres". On March 10, he notes, "Left camp at half-past 6 o'clock, and, crossing the stream, we followed the road, which is equal to a turnpike, on a course tangent to the southern end of the Picacho de los Mimbres (ed.: Cookes Peak). On nearing this mountain, we found that, instead of turning it, the road, after passing over two or three ravines, crosses a low spur by a steep ascent, but gradual descent, to Cooke's spring, at its base, where we camped, having made nineteen miles. This spring is a hole, or rather a pond, of sulphureous water, which disappears a short distance from its source. There are no trees, not even bushes, to indicate the existence of this spring." (*Report of explorations for that portion of a railroad route : near the thirty-second parallel of north latitude, lying between Dona Ana, on the Rio Grande, and Pimas Villages, on the Gila* , by John G. Parke, 1854). His map, (previous page), was published in 1859. In developing his maps, Parke relied on many sources, including trappers like Antoine Leroux, a French Canadian who had come to New Mexico in 1820.**

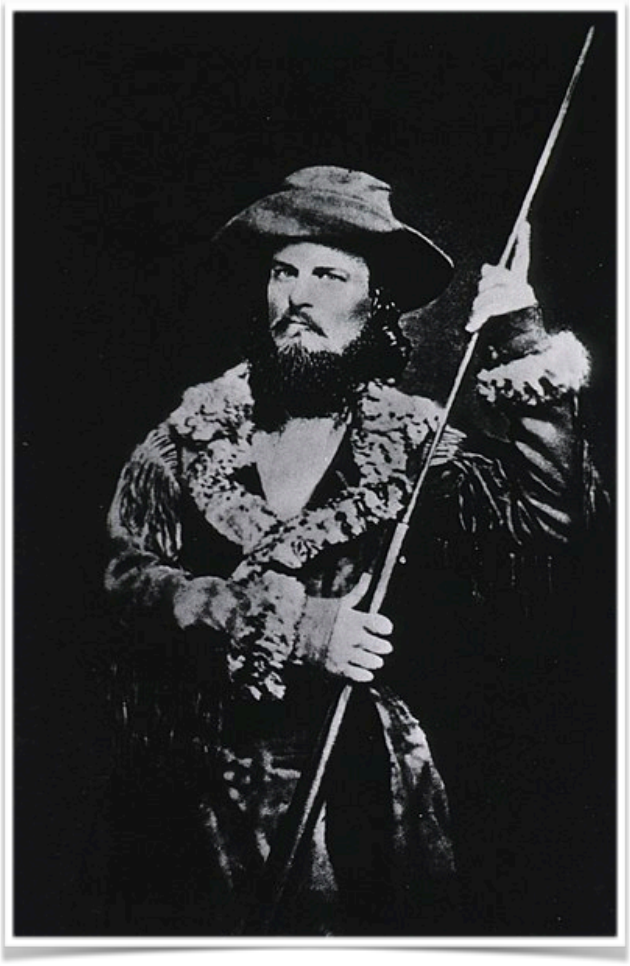
## Adolphus L. Heermann

**Heermann was a member of the Parke expedition. He was a doctor and naturalist. He collected many new species (flora/fauna) and a few, like the Heermann's Gull, are named in his honor. A photograph of Heermann, from about 1850, is shown to the upper right. He wrote "No. 1. Report Upon Birds Collected on the Survey" of *Reports of Explorations and Surveys.... Volume X. 1859 of the U. S. Pacific Railroad Explorations and Surveys 38th, 39th, 41st Parallels* in 1859. (Others filed similar reports.) His notes on the Aplomado Falcon, and the depiction of that species in the report (see page 90), are works of art.**

## Thomas Antisell

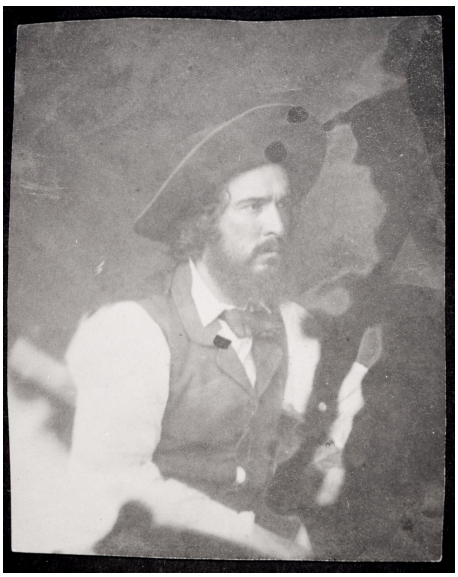
**Thomas Antisell was the geologist of Parke's Exploring Expedition of 1854. His time in the Black Range was limited. On August 9-10, the expedition's Camp 85 was on the left bank of the Mimbres. From there they travelled to Cooke's Spring, where they were on August 11-12, and from there to the Rio Grande.**

**Like so many on these expeditions of exploration, Antisell went on to numerous successes, including the identification of many of the California oil fields and time as an advisor to the government of Japan.**



## Caleb Burwell Kennerly

**Kennerly participated in two of the government expeditions in the Southwest during the mid 1800's: the Pacific Railroad Survey and the United States - Mexican Boundary Survey (1855-1857) under Emory. It was during the former that Kennerly collected the type for *Cyprinella formosa*, Beautiful Shiner, on the Mimbres in 1854. See page 90).**



Caleb Burwell Rowan Kennerly
(photo by George Gibbs)




***Hypotriorchis femoralis* (*Falco femoralis*, Aplomado Falcon), page 9 of Part 1 of *Reports of Explorations and Surveys.... Volume X. 1859 of the U. S. Pacific Railroad Explorations and Surveys 38th, 39th, 41st Parallels*.**

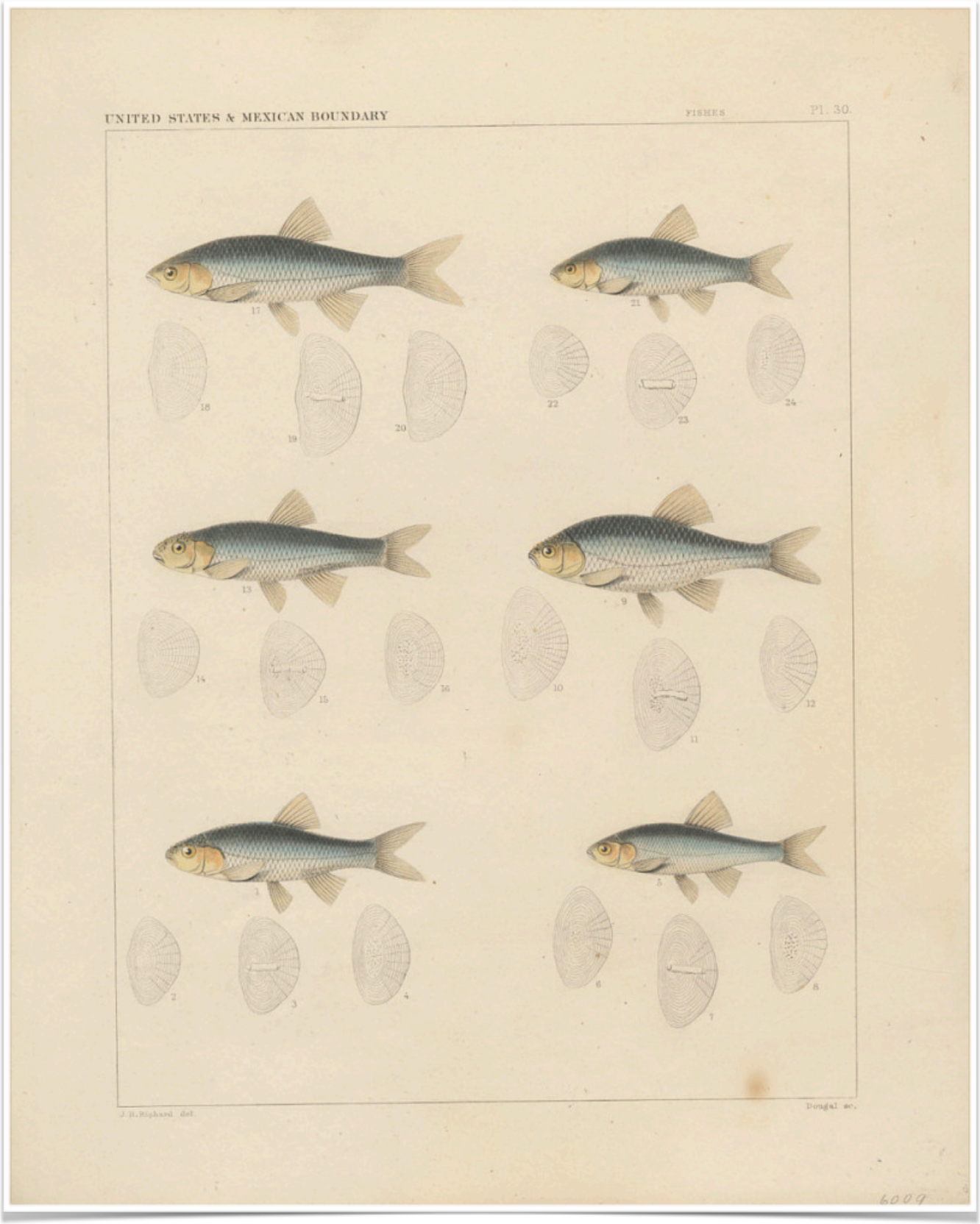



**Plate 30, Vol. II, Part 2, *Report on the United States and Mexican Boundary Survey*. Drawing by John H. Richard, engraving by William H. Dougal. In the survey report the fish depicted at the lower right is listed as *Moniana formosa;* it is now known as *Cyprinella formosa*, Beautiful Shiner. The type specimen was collected by Caleb Burwell Kennerly on the Rio Mimbres. This species is thought to be extirpated in New Mexico.**

## T. Charlton Henry

Henry recorded 170 bird species while stationed at Forts Thorn, Fillmore, and Webster, during 1853-54. He tallied his observations in "Notes derived from observations made on the Birds of New Mexico during the years 1853 and 1854", published in the *Proceedings of the Academy of Natural Sciences of Philadelphia,* Vol. VII, April 1855, pp. 306-317. He begins his discussion with a description of the vegetation and geology which surrounds the forts. In Volume XI of the same journal Henry updated his listing, "Catalogue of the Birds of New Mexico as compiled from Notes and Observations made while in that Territory, during a residence of six years", a listing of 198 species.

Henry collected the type specimen for the Crissal Thrasher, *Toxostoma crissalis*, at Fort Thorn in 1858 and published his description in the *Proceedings of the Academy of Natural Sciences of Philadelphia*, Vol 10, p. 117, "*Descriptions of New Birds From Fort Thorn, New Mexico*". In some histories of the event Henry misidentified the bird as a California Thrasher and sent it to John Cassin for confirmation. Cassin sent it to Baird, who described it as *Harporhynchus crissalis*, in his "*A History of North American Birds*", Volume 1, p. 351. Baird recognized Henry as the original collector/describer. At various times this species has been known as Red-vented Thrasher and Henry's Thrush.

At about the same time, Henry returned east with a specimen of a tortoise described by Le Conte in 1860 as *Kinosternum henrici*, later found to be the same as *K. sonoriense* (1854), also described by Le Conte.

## Randolph B. Marcy

**XXIII.–From Fort Thorne, New Mexico, to Fort Yuma, California.**
**[Distances in miles and hundredths of a mile.]**

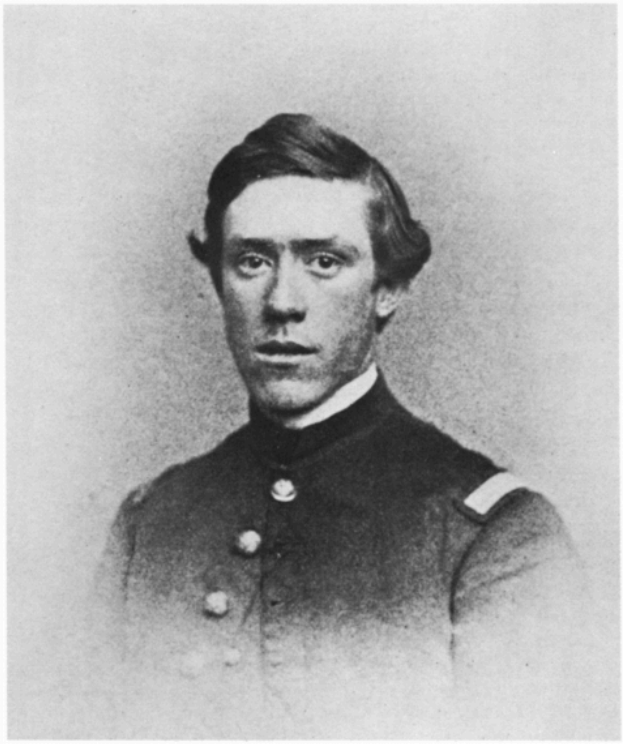
| From Ft. Throne | To |
|---|---|
| 14.30 | Water Holes. – One mile west of hole in rock. Water uncertain; no wood. |
| 9.19 | Mule Creek. –- Water at all seasons a little up the creek; wood plenty. |
| 12.00 | Cook's Spring. – Water sufficient for camping; mesquite bushes on the hills. |
| 19.50 | Rio Mimbres. – Water and wood abundant. |
| 16.30 | Ojo de la Vaca. – Water and wood. |

Marcy was not a naturalist but he did publish T*he Prairie Traveler. A Hand-Book For Overland Expeditions. With Maps, Illustrations, and Itineraries of the Principal Routes Between the Mississippi and the Pacific* in 1859. In it, he gave extensive advice on travel routes, equipment, and just about anything else an aspiring emigrant would need. He describes the route from Fort Thorne, New Mexico to Fort Yuma, California - see above.

## Elliott Coues

During his travels in New Mexico and Arizona (1864-66 & 1881) Coues collected more than 200 species of birds. He was a protégé of Baird and named the first bird species he described, the Baird's Sandpiper, after him. The short amount of time he spent in New Mexico was in the north.

The photograph of a young Coues is a reminder of how very young most of the explorers and naturalists were during their "field days".



Elliot Coues

*Bird-Lore*, vol. 4

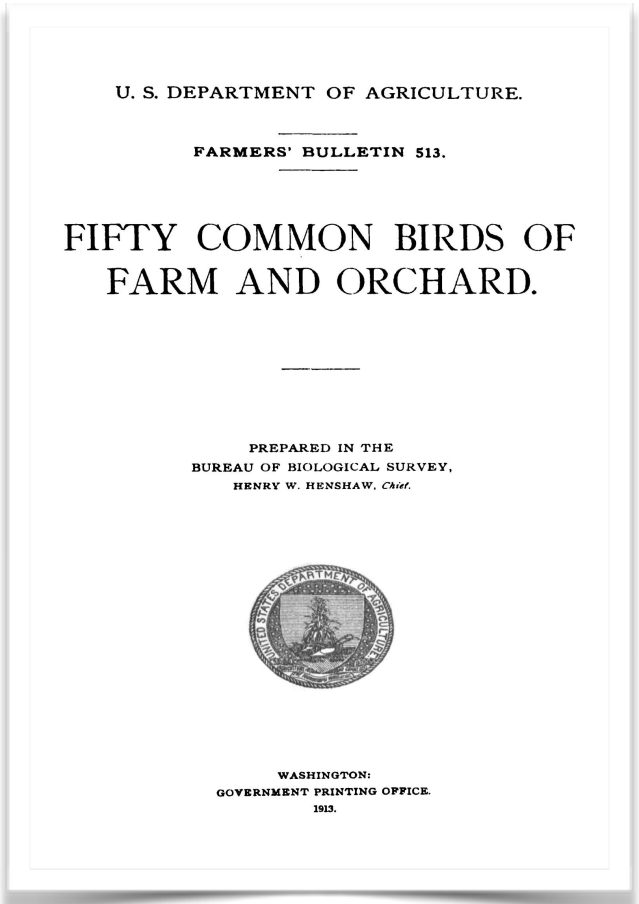
## Henry Wetherbee Henshaw

Henshaw was an ornithologist and ethnologist. In 1873 he traveled past the headwaters of the Gila River, observing large numbers of Wild Turkey in the area. Later he was to serve as head of the Biological Survey of the USDA.

In later life, as head of the Biological Survey, he published *Fifty Common Birds of Farm and Orchard*, which eventually morphed into the National Geographic Field Guide to Birds of North America.



1878 photo Henry W. Henshaw, at Camp Bidwell, California



U. S. DEPARTMENT OF AGRICULTURE.

FARMERS' BULLETIN 513.

FIFTY COMMON BIRDS OF FARM AND ORCHARD.

PREPARED IN THE
BUREAU OF BIOLOGICAL SURVEY,
HENRY W. HENSHAW, *Chief.*

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1913.

***The forerunner of the National Geographic Guide to the Birds of North America.***

**Henshaw discovered cliff houses on Diamond Creek in the Gila in 1877. They were described as: (they) "are among the first ruins of this character described in the Southwest". (*Antiquities of the Upper Gila and Salt River Valleys in Arizona and New Mexico*, Walter Hough; Bureau of American Ethnology, 1907, p. 29**

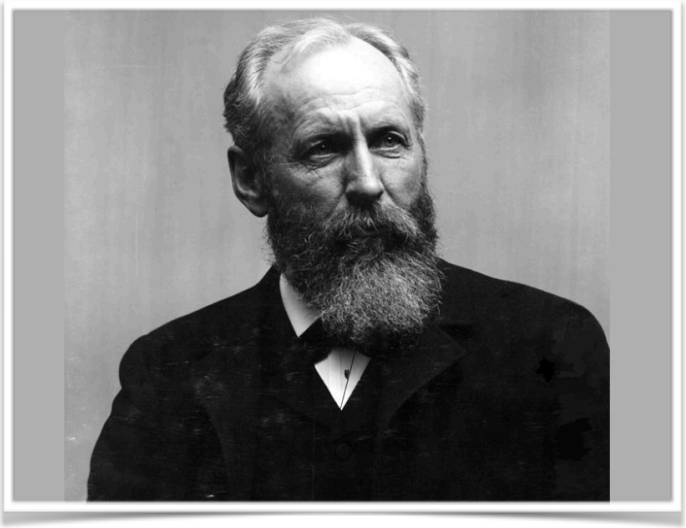
**H. C. Yarrow, H. W. Henshaw, and E. D. Cope were the authors of *The Zoological Collections Obtained From Portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona During The Years 1871, 1872, 1873, and 1874*. This work includes an extensive listing of specimens collected on those expeditions, including many from the Black Range/Gila. There are a few plates at the end of the work.**

## Grove Karl Gilbert

**Gilbert was one of the preeminent geologists of American history. In later life, he helped launch the USGS, was a founding member of the National Geographic Society, and was president of the Geological Society of America. He developed the basin-range geologic theory.**

**In 1871, Gilbert was conducting his first field season in the western United States, spending time along the Gila. (See note from that period on the following page, from p. 19 of the linked material). In the mid 1870's, Gilbert named the "Gila Conglomerate" deposit, describing it so: "The upper valleys of the Gila River and its branches, declining southwestward from the cliff southern rim of the plateaus, are occupied by an extensive deposit of conglomerate, that slopes down to the gravel plains between the basin ranges, but unlike these low-level deposits, which are as a rule still accumulating, the conglomerate is now trenched by valleys to a depth of 1,000 or 1,500 feet." (p. 52)**

**The material presented here (this and following page) is from the National Academy of Sciences, *Biographical Memoir Grove Karl Gilbert*, published in 1922.**



Grove Karl Gilbert in about 1910

Theoretical inquiries and speculations were rarely recorded, although it is impossible that a mind as active as Gilbert's should not have indulged in them frequently. A rare example is as follows, November 19, 1871:

. . . There are Problems connected with the +d sandstone [a cross-bedded yellow sandstone, 400 feet thick, in the upper Gila Valley]. 1st. How can it have originated conformably over a large area of limestone? The Potsdam [sandstone resting on crystalline rocks] is easily accounted for. It represents a gradual sinking of the land & is followed by the natural sequence of shale and limestone. If the +d sand also represents a sinking, where is the erosion of the complementary elevation? 2d. How came so great a mass to be cross-stratified in one system from top to bottom? . . . The uniformity of all beds along lines of mesa front and the line of the Colorado indicates that these lines were coast lines or parallel to coast lines during the original deposition. The belt of the +d sandstone may not be a broad one though it is already proven to be 100 miles long at least. Perhaps the bed was laid slowly during a period of constant conditions when a strong shore current bore the sand along to gradually build out a bar. In that case the ocean must have been south of the mesa line [plateau rim] for the dip is that way. . . . Later, having seen more of the +d sandstone I have to limit the description as to cross lamination. The lines do not run through the lines of bedding, though they present that appearance at a distance. At the top of a bed they terminate somewhat abruptly without deflection while at the bottom they become tangent to the line of bedding. The lines may have originally curved at the top also, & have been cut off by the currents that formed the succeeding bed.

The reason for this exceptional deliberation may be found in a preceding entry:

Mules and horses strayed this a. m. & some delay in getting them.

site of the famous Roosevelt Dam. Another example is the Gila Range, north of the first above named and east of the second; quartzite was seen at its southwestern base, but its greater mass is made of—

trachytes and trachyte conglomerates, unevenly bedded and surmounted by basalt. These are all exhibited in section in the southwestern face, which is steep, while the opposite face is constituted by the upper lavas, which, dipping in that direction, are continuous to the Bonito river, five miles away. The range is at this point a monoclinal mass of bedded lavas, whose eruption took place before the dislocation which produced the ridge, and the same structure probably continues to the northwest for fifteen miles (514).

The Mimbres Range, in southwestern New Mexico, more specifically described than most of the others, also affords significant structural elements; it consists largely of heavy lava beds, the uppermost of which is seen in a continuous sheet, wonderfully uniform in texture and habit, for 60 miles along the western slope, while Paleozoic rocks outcrop in the eastern slope. The whole mass was regarded as a monoclinal uplift with a fault along the eastern base, where the Paleozoic rocks are disclosed (519). If the Paleozoic rocks in this and in the Gila Range are more steeply deformed than the moderately inclined lava sheets, as is the case elsewhere in that district, and if the contact between the Paleozoic and the lavas is unconformable, as is elsewhere said to be the case, it might have been inferred that the first, presumably late Juras-



sic, deformation of the region affected only the ancient sedimentary strata; that a long period of erosion then followed by which the deformed sedimentary strata, were reduced to the moderate relief that they show beneath the lavas which eventually sealed them over; and that the monoclinal tilting, by which the basin-range structure was produced, was so recent as to be later than the lava outpourings.

Had the geological history of these two ranges been thus worked out, it would probably have been found similar to that deciphered by Louderback 30 years later for the west Humboldt Range in northern Nevada; but unfortunately, the inferences above made, simple as they now seem, were not made in 1873, perhaps for the reason that Gilbert saw the Gila Range imperfectly, and that he saw only the western lava-sheeted slope of the Mimbres Range; the occurrence of Paleozoic rocks along the eastern base of this range was reported to him by other members of the survey. On a later page, the Natanes Plateau, a gently inclined mass capped with sanidin-dolerite and lying in the upper basin of the Gila, is provisionally "regarded as a member of the Basin Range system"; it has a southwest-facing escarpment about 1,500 feet in height and 25 miles in length, "unquestionably due to a fault . . . of not less than 2,000 feet throw, . . . which has occurred since the eruption of the sanidin-dolerite." This is the example already cited, in the scarp of which, "instead of the scalloped figure, made up of convex curves, that results when erosion controls, we have a straight line, interrupted only by angular embayments, where it is intersected by water-ways"; and it is the only example in which these characteristics of a slightly dissected fault scarp, in contrast to a retreating escarpment of erosion, are specifically stated (528). It thus appears that the results gained during the third field season, as presented in the second report, do not materially modify the conclusions announced in the first report; although, had it been possible to take full advantage of the structure that appears to characterize the Mimbres Range, important modifications of those conclusions might have been presented.

**National Academy of Sciences, *Biographical Memoir Grove Karl Gilbert***

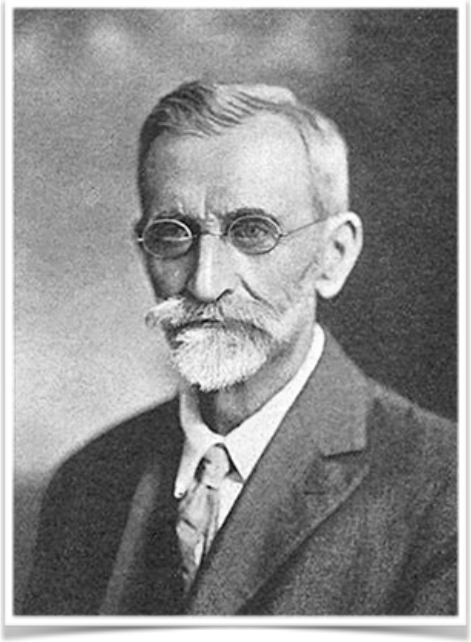
## Frank Stephens

**An ornithologist, Stephens was the first director of the San Diego Natural History Museum. He and his wife spent a little more than a year collecting birds and making observations in Grant County, including in the Mimbres and near Fort Bayard during 1875-1876. John Hubbard has written an excellent account of Stephens activity in this area. See "Frank Stephens: A century-ago birder in New Mexico", January 1976, *NMOS Bulleti*n 4(2-3):13-17, 1976.**

**Among the individuals collected by Stephens during that year in Grant County were two Aplomado Falcons (July 28, 1875, and August 8, 1875) and Lawrence's Goldfinch (January 20, 1876). The Goldfinch was apparently a first record for New Mexico. (From John Hubbard's work, linked to above.)**

**The photo of Lawrence's Goldfinch shown here was taken in Hillsboro, N.M., during March 2014.**

**In *Cultures of Collection in Late Nineteenth Century American Natural History* Matthew Laubacher describes Stephen's as: "a systematic collector who was employed by the leading ornithologists and mammalogists of the day: William Brewster, C. H. Merriam, and Joseph Grinnell." (p. 179) Stephens is the subject of the third chapter of this, Laubacher's doctoral dissertation at Arizona State University, May 2011.**



**From "Frank Stephens, An Autobiography", *The Condor*, Vol. 20, no. 5 (1918).**



**Unlike many of his predecessors in the study of natural history of this region, Stephens came to the area with his wife of one year, and their efforts were a family affair. The third chapter (pp. 179-249) of Laubacher's dissertation is an excellent characterization of the life of a professional collector at the end of the 1800's and beginning of the 1900's. After his stay at Ft. Bayard, Stephens apparently never did any serious work in New Mexico again.**

## Charles Wood Irish

**Irish was a botanist, geologist, and astronomer, who collected plants in the Mimbres in 1878 (no specific dates on specimen sheets).**

**Most of the naturalists who worked in and around the Black Range were here for relatively short periods and went on to live (generally) very successful lives. Irish is an example of someone who passed through and went on to greater success elsewhere. The following is from the September 29, 1904, issue of the *Reno Evening Gazette*.**

# CHARLES W. IRISH DIES NEAR ELKO

### FORMER SURVEYOR-GENERAL OF NEVADA

### Remains Taken to His Old Home in Iowa for Burial

Charles W. Irish a former resident of Reno and one of the most prominent residents of Nevada, died Tuesday evening at Gold Creek, Elko county, where he had been engaged for some time in the mining business. He was about 70 years of age and was known to all the older residents of the city, where he lived for a number of years.

Mr. Irish was appointed Surveyor General of Nevada by President Cleveland and held the office during Cleveland's first administration. Seven or eight years ago he became interested in mines at Gold Creek and made that place his home. He was taken sick about two weeks ago and when a physician reached his bedside he was unconscious and he remained in that condition until his death. His death was caused by uraemic poison.

The deceased leaves a widow and daughter, Lizzie, residing at Iowa City, Iowa, a married daughter living in Davenport, Iowa and a brother, John P., living in San Francisco.

The remains were taken to Elko, from which place they were shipped to Iowa City, Iowa, his old home, for interment.

Charles W. Irish was one of the celebrated engineers in the entire country. He surveyed Iowa for the Northwestern and the Burlington railroads, the Santa Fe's Colorado and Arizona routes, built the Royal Gorge and Grand Canyon bridges, the bridge over the Missouri and Omaha and laid out the early roads in both Dakotas.

**When Irish did his collecting in the Mimbres Valley he was probably working on a project for the Atchison, Topeka and Santa Fe Railroad. His diaries from this period are maintained by the University of Iowa Libraries.**

## Francis H. Snow

**In August 1881, Snow, who was a professor at the University of Kansas, led an "expedition" to southwestern New Mexico. In addition to Snow, the expedition included another professor from the University (H. S. S. Smith), L. L. Dyche (a natural history assistant), and Snow's twelve-year-old son.**

**They collected butterflies and moths in Water Canyon, twenty-five miles west of Socorro, until their "work of the month was seriously crippled by a hostile incursion of the murderous Apaches, who compelled us, after only five days of successful collecting, to abandon the locality". (In 1894 he returned to the same basic locale.) After this they collected for a day in Deming and later at Socorro. The Kansas Academy of Science published the list of their collected specimens (from 1881 and 1882, from Water Canyon and other sites in New Mexico) as "*Lists of Lepidoptera and Coleoptera...*". They collected specimens of 829 species, 70 of which were newly described.**

**Snow made collecting trips throughout the west, sometimes revisiting previously surveyed sites. In August 1884 he collected at Walnut Canyon, twelve miles north of Silver City and 3 miles west of the Continental Divide. "*Lists of Lepidoptera and Coleoptera Collected ... 1884*" is a listing of specimens from throughout the state, including Walnut Canyon.**




***Abaeis salome*, Salome Yellow collected by F. H. Snow in August 1884 at Little Walnut Creek, Grant Co., NM. Specimen in Snow Entomological Museum, University of Kansas, Lawrence, Kansas.**



Snow in 1891.

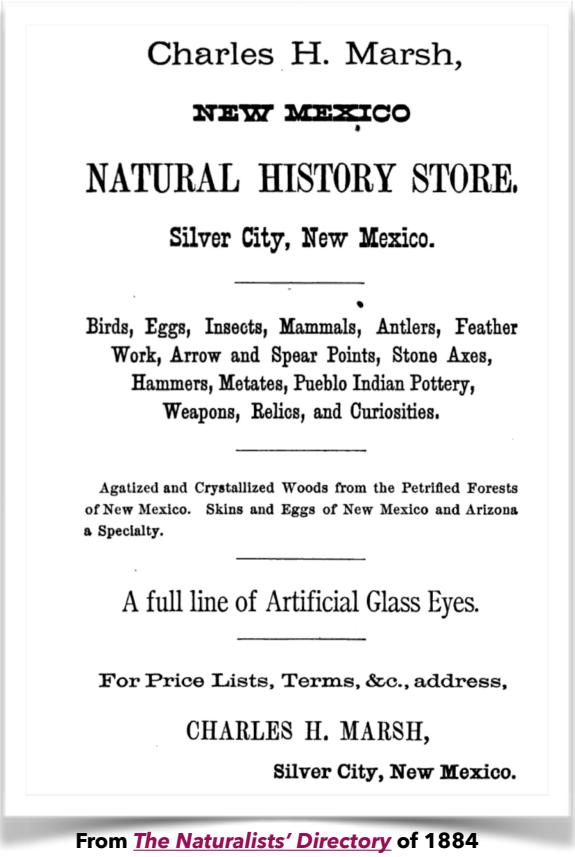
Writing about Walnut Canyon, Snow noted that "Here were found a considerable number of forms previously known to occur only in Arizona and old Mexico." (p. 65). He also provided some insight into the collecting experience: ". . . note that the season was a very dry one, there being hardly enough rain, except on one occasion, to thoroughly wet the canvas of our tent in the Walnut creek canon during a stay of five weeks. The bed of the creek was dry for long distances. Collecting "at sugar" was rewarded by very indifferent success. Some fine beetles and moths were taken "at light," by making huge fires of pitch-pine logs. Among these were *Plusiotis gloriosa, Plusiotis Lecontei, Orizabus Snowi, Strategus cessus, Aphonuis clunalis,* and *Cyclocephala manca. Lachnosterna longipilis* was taken at dusk while flying about the foliage of the live-oaks. The only specimen taken of *Chalcolepidius Webbii* was a large female resting upon an old pine stump. The electric lights at Silver City were very attractive to insects. Here were taken *Sphinx Elsa, Halisidota pura, Smerinthus occidentalis,* a magnificent *Daritis, Dynastes Grantii*, and other fine species of both *Lepidoptera* and *Coleoptera*. *Dendrobias quadrimaculatus, Clerus Spinolce,* and *Macrobasis ochrea* were found abundantly upon the blossoms of the tall species of yucca in the vicinity of Deming and Silver City." (p. 69)

Snow discovered more than 200 species of insect during his career.

## Charles H. Marsh

Marsh performed his observations in and around Silver City from 1883 - 1886, publishing many reports. He was primarily an ornithologist and a professional collector. Hubbard (see link below) notes that he obtained the second skin and recorded the third record of Ferruginous Hawk in New Mexico on November 8, 1884, near Hurley in Grant County. ("*The 19th and early-20th century status of the Ferruginous Hawk, with emphasis on that in New Mexico and adjacent states*", John P. Hubbard.)

Hubbard and Carla Dove have written on Marsh's collecting activities in "Our Reevaluation of a Worthen's Sparrow and Three Other Anomalous Specimens From Charles H. Marsh's 1884-1886 Collections of Birds From Southwestern New Mexico."



Charles H. Marsh,

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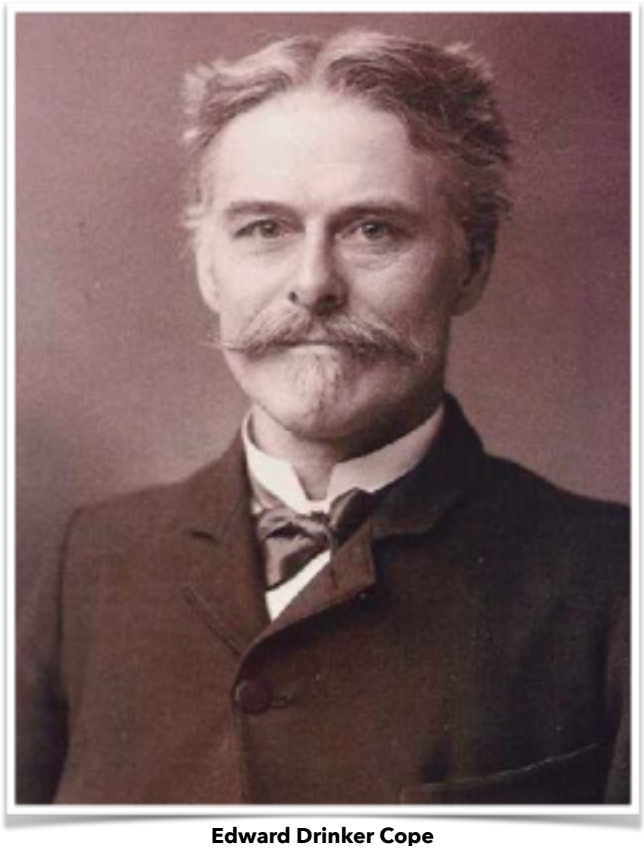
From *The Naturalists' Directory* of 1884

## Edward Drinker Cope

Mining in the west has a nasty reputation. That reputation was well deserved in the case of Lake Valley. The mines at Lake Valley were owned by the Sierra Grande Mining Company. Whitaker Wright established the holding company and increased his wealth immensely by selling $5 million in shares in his company all over the world. It is reported that the Sierra Grande Company was paying out $100,000 a month in dividends at this time. His business practices were based on misleading and often fraudulent information. He died a rather dramatic death, taking cyanide in a London courtroom rather than going to prison for fraud.

Good can be in the eye of the beholder, and sometimes "good" comes from dastardly deeds. Starting in the 1860's, the great bone war broke out between Edward Drinker Cope (who is one of America's great paleontologists and a person who kept one of the largest private collections of fossils at the time) and Othniel Charles Marsh, another of America's great paleontologists. The



Edward Drinker Cope

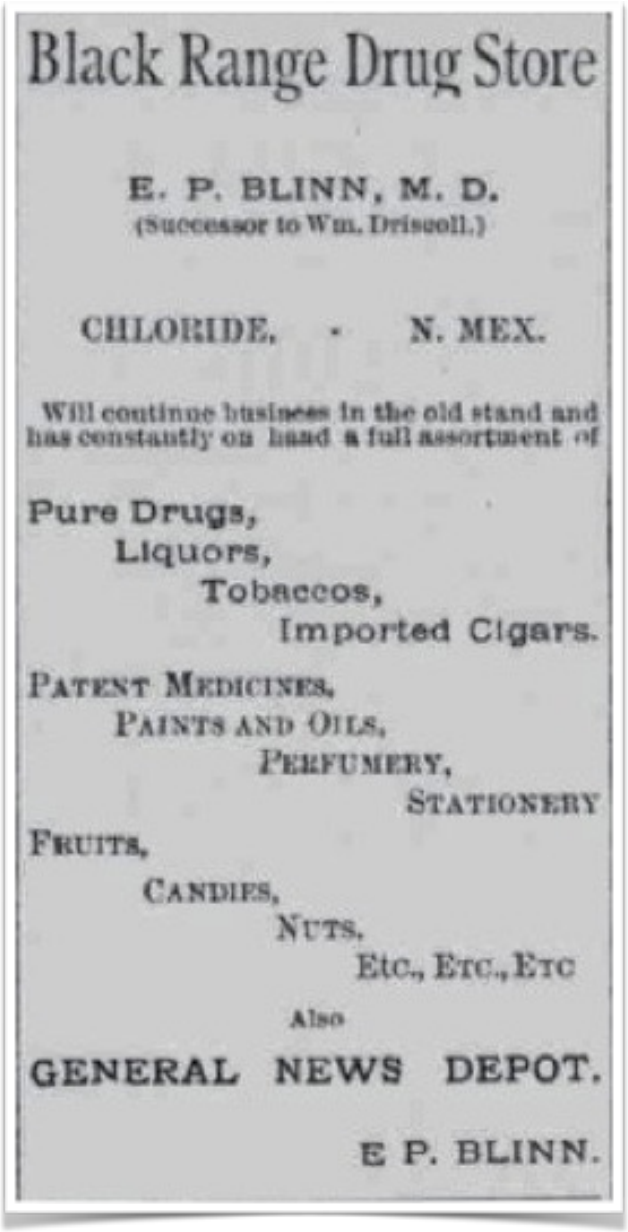
competition between the two became bitter and expensive and grew to include their major sponsors (John Wesley Powell in the case of Marsh). To continue his collecting, Cope sought to augment his personal fortune by purchasing a lot of stock in the Lake Valley mines. The mines played out in 1883. In 1886 he had to sell his worthless stock, and in 1895 he sold his priceless set of mammal fossils from the west (over 10,000 specimens) to the American Museum of Natural History for $32,000. Cope's travails and hardships became the American public's gain.

## Elmer Philo Blinn

In 1890, Blinn (photo right) provided the Biological Survey with a breeding bird list from Chloride. He was a leading citizen of the town at the time and is frequently mentioned in the local newspaper, *The Black Range* newspaper. The early years of the paper are covered on the Black Range Website. Like many citizen naturalists he had another life. (See ad from the February 1, 1884, issue of *The Black Range* newspaper, to the right.)

## Frank Springer

Frank Springer was a successful New Mexico lawyer who played in big-time New Mexico politics. He is best known in many circles for his activities in the arena of human culture. We leave the discussion of those activities to the drama students.



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(Successor to Wm. Driscoll.)

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E P. BLINN.

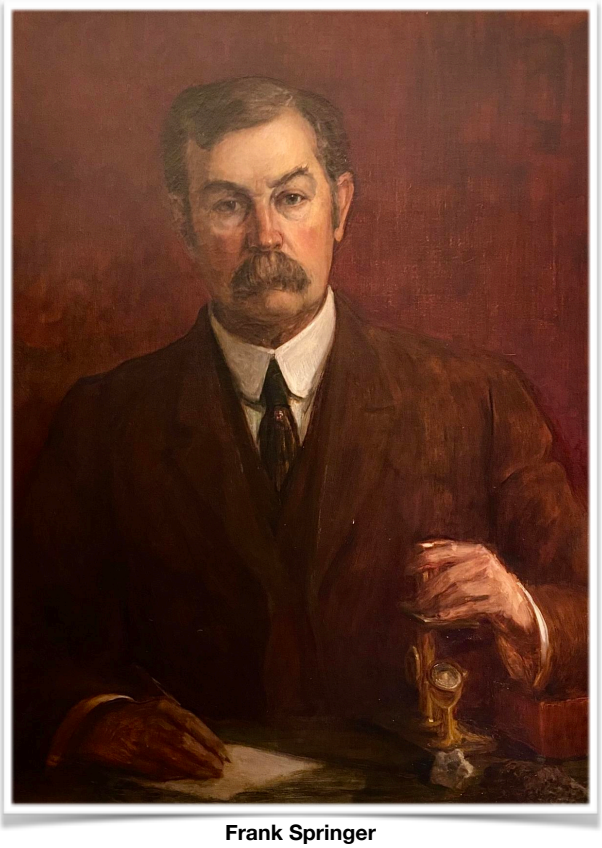


E. P. Blinn

Here we discuss Springer's passion. He wished to be financially independent so that he could pursue his study of crinoids. He wrote several books, monographs, and taxonomic papers on crinoids and eventually gave his crinoid collection to the Smithsonian, the National Museum of Natural History. The Springer Echinoderm Collection is the largest crinoid collection in the world. "Most of the Museum of Natural History's fossil echinoderm collection, and the large library associated with it, were donated by Frank Springer in 1911." (website link above) The taxonomic classification of crinoids was the source of vigorous debate between Springer (and his associate Charles Wachsmuth) and Francis Arthur Bather at the end of the 1800's. Bather and Springer remained the primary authorities in this field until about 1925, Wachsmuth having died before the turn of the century. The rivalry was far from civil: each man's critiques of the other's work included words like "ridiculous". In a letter to Louis Agassiz (February 15, 1888) Springer described his relationship with Wachsmuth, writing, "our work is the result of an undertaking in which Wachsmuth furnishes the brains and I the money, and both, I think, a fair equivalent of enthusiasm."

In 1884, Springer published "On the occurrence of the Lower Burlington Limestone in New Mexico", *American Journal of Science*, Vol. XXVIII, No. 158, February 1884, pp. 97-103. In that article Springer described his observations, in 1882, of what is now known as the Lake Valley Limestone Formation.

Kues (see below) notes that "Excluding Pennsylvanian and



Frank Springer

Cretaceous fossils only the diverse Early Mississippian faunas near Lake Valley had received modest attention. Frank Springer (1884), a noted territorial lawyer and paleontologist (see Caffey 2006), discussed many taxa, though without illustrating them, and a few of the Lake Valley Limestone's famous crinoids were included in Wachsmuth and Springer's (1897) monograph." (*Celebrating New Mexico's Centennial - The Geology of New Mexico as Understood in 1912: An Essay for the Centennial of New Mexico Statehood, Part 2*, Barry S. Kues, University of New Mexico, p. 40).

Greger reported that he had received specimens from Springer in 1900, from Lake Valley, but that the "exact horizon of the specimens was not known". ("Synonymy of Ptyehospira Sexplicata", *American Geologist*, Vol. XXV, May 1900, pp. 266-267, Greger.)

## The New Mexico School of Mines

The university in Socorro opened in the fall of 1893. Its role was enhanced in 1927 when the New Mexico Bureau of Mines and Mineral Resources (now NM Bureau of Geology and Mineral Resources) was added to the institution.

Studies performed by the Bureau and the University have added significantly to our knowledge of the geology of the Black Range.

The school's name was changed to New Mexico Institute of Mining and Technology in 1951.

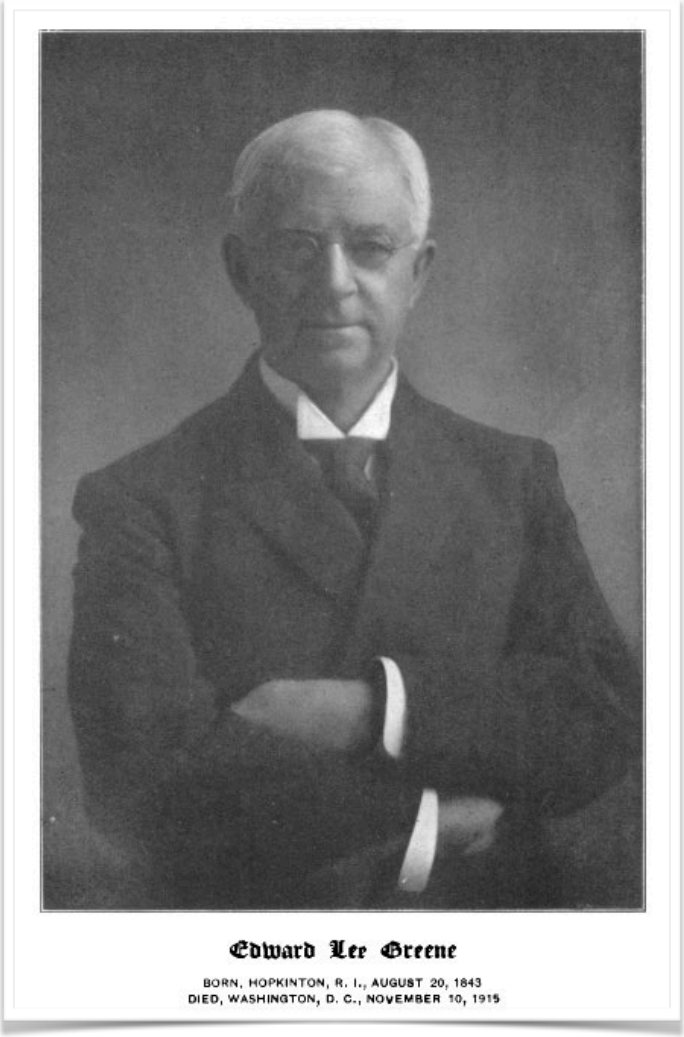
## Edward Lee Greene

Greene is credited with naming or redescrbiing over 4,400 plant species in the western United States. The photograph on the following page was taken shortly before his death.

Greene spent much time in New Mexico. In March 1878 he published "*Rambles of a Botanist in New Mexico*" in the *American Naturalist*. Speaking of his time in the vicinity of the Santa Rita Copper Mines he noted, "It is an interesting region, the natural history of which has not been looked into except by the few scientists who have accompanied one or two government surveying expeditions in passing through it. Aglow with the ardor of a botanist in a new field of study, I entered this remote corner of New Mexico from the westward early in April. The broad expanse of plains through which runs the boundary line between this territory and Arizona was already decked with a profusion of flowers. The number of species was not great, but each species was represented by myriads of individuals, so that the whole prairie landscape seemed painted in lively colors." (p. 172) This describes part of a trip made by Greene from San Diego to Santa Fe via our area, on foot, in 1877.

By 1880 he was back in Silver City and collecting in the Black Range. Four specimen sheets from this period are included on the page 100, three of which were originally described by Greene in the *Botanical Gazette* issue of January 1881 (Vol. VI,

No. 1, p. 158). In that article, Greene described six new species from Southwestern New Mexico, including two species of *Lithospermum*. He collected *L. viride*, Greene Gromwell, "in the Mimbres Mountains, near Georgetown, in 1877, and on Swan Mountain, near Silver City, 1880". The specimen sheet from "June & July" 1880 is the syntype of the species and is shown on the following page. Also on the following page is the type specimen sheet for *Lithospermum cobrense*, Smoothtroat Stoneseed, collected at Santa Rita del Cobre. (In 1880 he also collected other specimens of this species in the area of the Copper Mine and around Silver City.) The *L. cobrense* description is a redescription, Greene noting in the article that "Doubtless all that has been called *L. canescens* from New Mexico and Arizona is of this species. According to Dr. Gray it is Wright's No. 1563, Coues and Palmer's 275, and Rothrock's 202 and 633. That it is distinct from *L. canescens*, is obvious at first sight of the living plant, by the conspicuous tuft of root leaves. The pale yellow, fragrant flowers are commonly as large as those of *L. hirtum*. I name the species in reference to that classical locality, Santa Rita del Cobre, where Mr. Wright collected it first, and where I first saw it in 1877." (p. 158)



Edward Lee Greene

BORN, HOPKINTON, R. I., AUGUST 20, 1843
DIED, WASHINGTON, D. C., NOVEMBER 10, 1915

In the *Botanical Gazette* issue of March 1881 (Vol. 6, No. 3) he described new species from New Mexico (Pinos Altos area) and Arizona (pp. 183-185). In the June 1881 issue (Vol. 6, No. 6) he added more to the list. (pp. 217-219)

In the days before the internet, collaboration was slower, but it occurred. In the April 1881 issue of the *Botanical Gazette* (Vol. 6, No. 4, p. 198). Greene had the following collaborative effort published.

On the Colors of some Western Flowers.—There are a good many mistakes about them in the books *Cordylanthus Wrightii*, Gray, for example, is everywhere described as having a purplish corolla, whereas it is of a fine, light-sulphur yellow, which stands in showy contrast with the commonly rich, dark purple calyx which half encloses it.

*Orthocarpus purpureo albus*, Gray, is said to have corollas "purple and often partly white;" the truth being that they are always clear white on opening, and that after the first day they change to rose-purple.

In the January GAZETTE under *Ribes pinetorum*, Greene, I said that the flowers of *R. leptanthum*, Gray, are "white, not yellow, as said by Mr. Watson in Bot. King." But Mr. Watson writes to me that he has seen acres of it with yellow flowers. Now though the species occurs plentifully west of the Rocky Mountains I do not happen to have met with it but in Colorado and New Mexico, the locality whence it was first obtained, and I have never seen it but with white flowers, though there is usually a tip, or marking of decided green. The dubious var. *brachyanthum*, Gray, of California shows a tinge of purple. Will not our botanists in different parts of our western field take notice, the coming season, and all tell us through the GAZETTE what they find to be the color of flowers in *R. leptanthum*? Of course they may vary in different localities, but if this be the case, it should be established clearly.—EDWARD LEE GREENE.

Greene continued to publish prolifically throughout his career. His early publications focused on new concepts of taxonomic classification. That approach brought him into conflict with many other botanists including Asa Gray. Gray and Greene were not the best of friends, or perhaps it is better to say that their relationship was interesting. Greene challenged Gray's taxonomic order and Gray did not like that. Sometimes their critique of the other's work was blunt and unflattering. Later in his career, Greene focused on the history of botany and published *Landmarks of Botanical History*, Part 1, in 1909. Part 2 was unfinished.

The fights over taxonomy were bitter and personal. Greene's personality contributed to the conflict. In "Ninety Years After Greene", Eugene Jercinovic states "Contentions that Greene strongly influenced the course of botany in the United States, that he had a powerful effect on botanical nomenclature, that he was a prodigious collector and describer of plants, that he was an important contributor to the emergence of a western school of botany in the U. S., are indisputable. Assertions that he refused the judgments of others, that he was quick to dismiss and sarcastically decry the work of peers, that he felt his capabilities of observation were superior to those of other botanists, and that he did not work smoothly with others, are hardly deniable." In the camp with Gray was Thomas Coulter who wrote about Greene (from Jercinovic above) "In a letter to Sereno Watson on June 12, 1890, 'If he could only quietly pass away in one of his apoplectic fits, how much better for American botany!'" (per Jercinovic) On the other side of the battle line, supporting Greene were C. C. Parry and Willis L. Jepson.

Gray spent much of his life describing plants collected by others, and Jercinovic notes that Greene "felt that a true understanding of plants could only be gained in the field and that 'closet' botanists could not possibly understand the subtle differences between plants observed while alive." Greene challenged "the establishment" on many fronts. His contributions have stood the test of time well.

In one of his obituaries it was noted that "He was indeed a man of many moods and fancies; was often shy but never timid; always had many friends and many enemies. He was egotistical,




***Packera cynthioides*, White Mountain Groundsel, (identified here as Senecio fendleri) on the right, collected in the Black Range (Mimbres Mountains) on September 22, 1880. Original description by Greene.**




***Cylindropuntia leptocaulis*, Christmas Cactus, collected in the Black Range (near Kingston?) in February 1880 by Greene and known at that time as *Oputina leptocaulis*.**




***Lithospermum cobrense, Smooththroat Stoneseed, collected at Santa Rita del Cobre, in July 1880. Type specimen.***




***Lithospermum viride, Greene Gromwell, collected near Silver City in June/ July 1880 by Greene.***

sometimes to the point of being ludicrous, and yet to many of us who knew him well he was always a delight and an inspiration. He was fond of music and cards, was a charming host, and a welcome guest in many homes. He lived a quiet life, usually alone with his pets, often doing his own cooking and housework." (*Botanical Gazette*, January 1916, J. N. Rose, p. 71)

Among his many works is *Illustrations of West American Oaks*, from 1889. Greene wrote the text for his work and Albert Kellogg made the drawings. One of Kellogg's drawings, of a Gambel Oak, is shown on the following page, followed by a photograph of the species from the Black Range.

## Edward Lee Greene and O. B. Metcalfe

In 1894, Greene left the University of California, taking a position at the Catholic University in Washington, D. C.. In 1904 he left the Catholic University and began work at the Smithsonian. In 1915 he took a position at Notre Dame and died later that year.

During this period in the East he became one of those "closet" botanists making species determinations from specimens collected by others.

His close association with the Black Range did not end with his last collecting trip to the Silver City area and the Black Range. For example, from at least 1903 to 1905 specimens collected by O. B. Metcalfe (see entry later in this book) were sent to Greene for species determinations. A number of these specimens are identified as type specimens (isotype, type, etc.) for the species. Metcalfe's efforts were recognized by Greene, who included Metcalfe's name in the latin binomial when he first described some of the species.

Greene determined the species for specimens collected by Metcalfe throughout the area. For instance, all of the specimens shown here and on the following pages were collected by Metcalfe, at or near Kingston, with original species determinations made by Greene. They include: *Chenopodium graveolens*, Fetid Goosefoot; *Acer negundo var interior*, Interior Boxelder; and *Rhus glabra*, Smooth Sumac.

In the southern part of the Black Range, the type specimens of *Ipomopsis aggregata* subsp. *formosissima,* Skyrocket;




*Grindelia arizonica var. dentata*, Arizona Gumweed, collected by O. B. Metcalfe on September 19, 1903 near Silver City. Species determination (as *Grindelia squarrosa*) by E. L. Greene.



QUERCUS GAMBELII, Nuttall.



*Quercus gambelii, Gambel Oak, Grandview Trail, Black Range, September 27, 2020*

***Drymaria depressa*, Pinewoods Drymary; *Boechera perennans* - Watson (*Arabis angulata*), were collected by Metcalfe and determined by Greene - as were many more.**

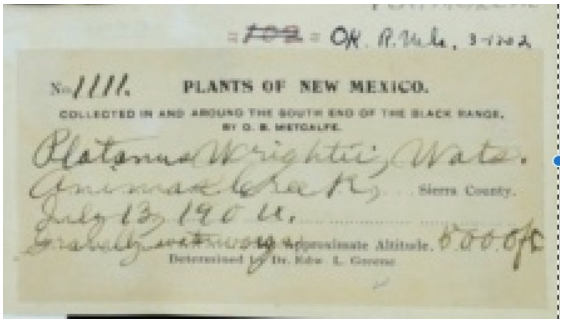
**This arrangement was very successful. In "Descriptions of New Plants Preliminary to the Report Upon the Flora of New Mexico" by Wooton and Standley (*Contributions from the United States National Herbarium*, Vol. 16) the authors note that they "have included several plants determined as new species by Dr. E. L. Greene, but never described. These are principally from the collections made by Mr. O. B. Metcalfe. Many other plants of Mr. Metcalfe's collections, distributed under new names, we have associated with published species." (p. 112)**

**Greene had a history in southwestern New Mexico, but when Metcalfe was collecting Greene was in the East, never to return. Why then, was Metcalfe sending specimen sheets to Greene for species determinations? Metcalfe was a student of E. O. Wooton, a significant figure in the history of New Mexico botany. Greene, however, was the big name of the era. Having a working relationship with Greene was a significant accomplishment. Even more importantly, Greene and Wooton subscribed to the same taxonomic philosophy; Greene and the "splitters" had succeeded in ousting the old guard, giants like Asa Gray. For Metcalfe, working with both Greene and Wooton was "career enhancing", and simply based on his collecting efforts, Metcalfe remains a major figure in the botanical history of southwestern New Mexico.**

**And then in 1905 his botanical career seems to have stopped.**




***Platanus wrightii,* Arizona Sycamore, Collected in Animas Creek by O. B. Metcalfe on May 7, 1905, species determination by E. L. Greene. The Sycamores of the Animas Creek are disjunct from the populations to the west.**






***Rhus glabra,*** **Smooth Sumac. Collected by O. B. Metcalfe, species determination by E. L. Greene, collected near Kingston on June 16, 1904.**




***Rumex hymenosepalus,*** **Canaigre, Collected west of Hillsboro by O. B. Metcalfe on May 7, 1905, species determination by E. L. Greene.**




***Salvia reflexa,*** **Lanceleaf Sage. Collected at Kingston by O. B. Metcalfe on August 6,1904, species determination by E. L. Greene (as *Salvia lancifolia* - Poir.).**




**Collected at Kingston by O. B. Metcalfe on May 7, 1905, species determination *(as Rosa fendleri)* by E. L. Greene. In 1913 Wooten and Standley redescribed this specimen as *Rosa hypoleuca* (name unresolved) this specimen is the isotype.**

## E. O. Wooton

**Wooton was the Professor of Chemistry and Botany at the New Mexico College of Agriculture and Mechanic Arts in Las Cruces, New Mexico. He became New Mexico's first "resident plant scientist" (the Experiment Station Chemist and Botanist) in January 1890. It was in that position that he collected plant specimens in the Black Range during the 1904-1906 period. He remained at the College until 1911.**

**Among Wooton's students (and because he taught many subjects at the new college, there were many) was Paul C. Standley (see later entry) with whom he collaborated on seminal works of New Mexico botany.**



***E. O. Wooton in 1896 (age 31)***

**In 1902 he was in the Gila, observing the flooding events that shaped the landscape. In his field notes he wrote:**

> **"The river valley grows narrower & less & less land is available for cultivation. The flood plain of the river is about 1/4 mile wide. Floods are becoming more important all the time. Every feeder of this river sends down a flood whenever there is even a moderate rain over the areas they drain. Then two or three small valleys send in their floods at the same time, the river gets a "boom" and is impassable for hours. And these floods come down small canons which were formerly all more or less arable lands, but are now barren, rocky, watercourses. There is but one explanation for most of it – overstocking the ranges. The waste is enormous, and increases each year." (August 15, 1902)**

**He published more than 30 works in the early 1900's, including major monographs like "*Descriptions of New Plants Preliminary to a Report Upon the Flora of New Mexico*" (1913) and *Flora of New Mexico* (1915). The latter recorded the 2,903 plant species then known in New Mexico. Both of these works were written in collaboration with Paul C. Standley.**

**The Society for Range Management published an article by Kelly Allred in its October 2008 issue of *Rangelands*. Entitled "E. O. Wooton: New Mexico's Pioneer Botanist", it is an excellent life history of Wooton.**




*Rumex salicifolius var. mexicanus*, Mexican Dock, collected by E. O. Wooton near Chiz in the Black Range on July 15, 1904.

**Based on specimen sheets, it is apparent that teacher (Wooton) and student (O. B. Metcalfe) were collecting in the same area at the same time (mid-July 1904), certainly within ten miles of each other. But ten miles can be a long way in the rugged canyons of the Black Range, and specimen sheets are sometimes inaccurate when it comes to describing where the specimens were collected. So who knows. It was in 1904, in the Black Range, that Wooton had the front bolster of his wagon snap; he had to make one from the trees near by. To get an idea of what that might entail, watch this YouTube presentation.**

**Some of his notes from the July 1904 trip to the Black Range are insightful - in all sorts of ways. The following is from "Elmer Ottis Wooton and the Botanizing of New Mexico" by Kelly W. Allred, in Systematic Botany, Vol. 15, No. 4 [Oct.-Dec. 1990], p. 702.**

Got a little hay at 2½¢ ($50 a ton) at Hermosa and a 10¢ box of axle grease for 25¢: but we had to have them. Loaded on water and hay and drove on so as to get to Fairview sure tomorrow. Driest mountains I ever saw at this alt. (about 6500) in my life. Pine, piñon, Juniperus pachyphloea [J. deppeana] and J. occidentalis [J. monosperma]. No grass, oaks all browsed, Q[uercus] neomex. [Q. gambelii ?] occasional; Q. grisea common. Q. emoryi in arroyos doesn't seem to be browsed. Fallugia common in [Arroyo] Seco near windmill. Stock in bad shape what little there is of it here. Lots of it dead. Landlady at Hermosa (Mrs. Ayers) a queer one. Got photo of fasciated O[puntia] arborescens growing in her yard. (Neg 12). This region ought to be all heavily grassed with B[outeloua] oligostachya [B. gracilis]. In its present condition it will take not less than 5 years for it to recover.

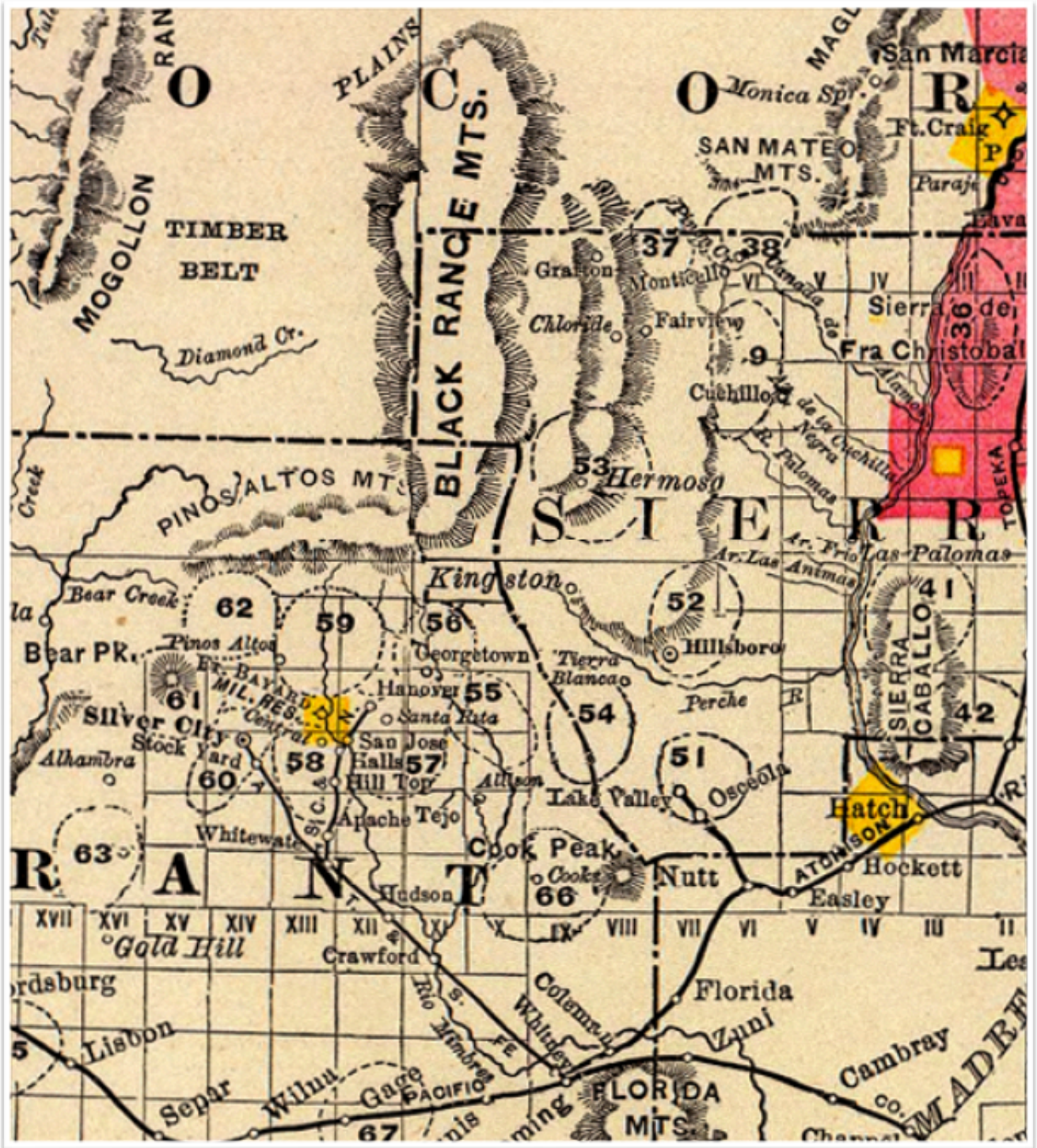
**Wooton's interest was not limited to one, or even several, segments of botany. For instance, he and Standley published "The Ferns of New Mexico" in the July-September, 1915 (Vol. 5, No. 3) issue of the *American Fern Journal*. Several species from the Black Range are discussed in the work. In 1903, Wooton had published "The Ferns of the Organ Mountains" in *Torreya*, Vol. 3, No. 11 (November 1903), pp. 161-164.**

**In "The Larkspurs of New Mexico" (*Bulletin of the Torrey Botanical Club* , Jan. 1910, Vol. 37, No. 1, pp. 31-41) Wooton shed some light on the status of botany in the Territory when he noted that:**

> **"Recently I had occasion to name a specimen from the Black Range, and in comparing it with our herbarium material my 'eyes were opened' and I saw that there were various and different specimens labeled *D. scopulorum*, more forms than could properly belong in what Dr. Gray called "a collective species." Whether these various different kinds of plants are to be called different species, varieties, or races is a question which has not yet been decided, but it seems to me proper to call attention to the differences which I think can be seen by any one who is sufficiently interested to look, and I shall follow my own solution of the above question and call them species. Others may do as they like in designating the degrees of differentiation." (p. 31)**



***"but it seems to me proper to call attention to the differences which I think can be seen by any one who is sufficiently interested to look, and I shall follow my own solution"***




Rand, McNally & Co.'s business atlas map of New Mexico. : 1897 issue date, created in 1888

# Anna Isabel Mulford

**Dr. Anna Isabel Mulford (1848-1943) received her undergraduate degree from Vassar College in 1886 and her Ph.D., in Botany, from Washington University, in 1895. She was the first student to receive a doctorate at that university. The topic of her dissertation was her research on the agaves of the United States. It served as the basis for her book, *A Study of the Agaves of the United States*, published by the Missouri Botanical Garden. Her work is an excellent example of how interconnected the world of science can be. In her acknowledgments for the book above she mentions Mearns, Townsend, S. B. Parish (see Jan. 2021 issue of the *Black Range Naturalist*), Wilcox, Macauley, Wooton, and many others.**

**She collected widely in the United States: 1892 in Idaho, 1892 in Colorado, 1895 in New Mexico, 1898 in Utah, as well as many other locales and dates. During 1895, she collected extensively in the area of the Black Range, from Silver City to the west to Hillsboro and Lake Valley in the east, from Deming in the south to the north part of the range. During her research she discovered several new species.**

**In *A Study of the Agaves of the United States* she also provides some perspectives on human cultural history as it relates to the uses of various plants. For instance, in her discussion of *Agave palmeri* she notes:**

> **"The species most eagerly sought after by the Apaches are *A. Palmeri*, and *A . applanata Parryi*. Mr. Coville gives a very interesting account of the use of even the small *A. utahensis* by the Panamint Indians. The process of cooking seems to be much the same in all cases. A large pit is prepared and lined carefully with small smooth stones. A fire is kept up within the pit until the stones are thoroughly heated, and then raked out leaving the pit ready for use. The plants are trimmed until nothing is left except the hearts, which consist of the sweet juicy stalks and young leaves. These are heaped on the hot stones in the pit, covered over with grass and earth and left to steam for two or three days. By this time all except the fibrous tissue is reduced to a jelly-like mass, very palatable and nutritious. Captain Bourke states that the Apaches put in the pit a plug made of the stalk of the plant. This they pull out as a test, and if the end of the plug is cooked the squaws decide that the whole mass is." (Page 61 of cited work - capitalization of the latin binomial as in the original.)**

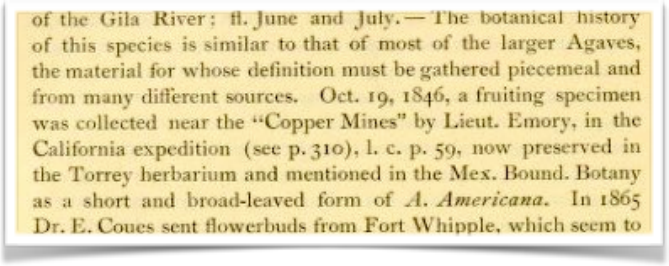
**Other descriptions of this process follow and other uses of the *Agave*, in the making of rope, for instance, are also described.**

> **"Professor Toumey's letter already referred to goes on to say that the epidermis and fibers, separated by the squaws from the edible portion of the mescal, are not thrown away, but are taken by the men, thoroughly washed and cleansed, and the fibers well separated, so that they can be made into ropes. Each man takes a quantity of these fibers, and begins to twist. When the strands are of sufficient length, they are tied to trees, and the men backing away from the trees continue to add fibers and to twist. Their work is assisted by small sticks, about a foot long and larger and heavier at one end. By fastening the small end to the rope close to the hand, the twist made is given a greater force by the motion of the heavy end in flying round and round. When the ropes are of the required length, the loose ends are pegged to the ground and left for several days to dry. Professor Toumey writes that hundreds of these ropes were staked out in the camp that he visited." (pp. 62-63 of cited work)**

**The taxonomic structure of *Agave* which she presents has changed somewhat in the last 120 years. Of particular note to us in the Black Range is the treatment of *A. applanata* as a species which included *A. parryi*. In speaking of *A. parryi* she notes the following specimens:**

> **"New Mexico, Copper Mines, E . H . Emory, October 19th, 1846 . . . This plant was discovered by Lieut. Emory, October 18, 1846, near the Copper Mines, Santa Rita Mts., New Mexico, on his famous trip to California. He states that 'the Apaches make molasses of the plant, and cook it with horse meat. ' Both Dr. Parry and Dr. Palmer also state that it is the plant used by Indians of the 35th Parallel for making 'Mescal', but Dr. Wilcox asserts that the *A . Palmeri* is the only species used in Arizona for that purpose, and also that the cattle will only nibble the *A . Parryi* but that they eat the *A . Palmeri*." (pp 84-85 of cited work)**

**Dr. George Englemann, in "Notes on Agave", in *Transactions of the Academy of Science of St. Louis*, Vol. III, 1868-1877, printed in 1878, p. 312, added a bit more about the Emory specimen**



of the Gila River; fl. June and July.— The botanical history of this species is similar to that of most of the larger Agaves, the material for whose definition must be gathered piecemeal and from many different sources. Oct. 19, 1846, a fruiting specimen was collected near the "Copper Mines" by Lieut. Emory, in the California expedition (see p. 310), l. c. p. 59, now preserved in the Torrey herbarium and mentioned in the Mex. Bound. Botany as a short and broad-leaved form of *A. Americana*. In 1865 Dr. E. Coues sent flowerbuds from Fort Whipple, which seem to

**(below).**

**In the March 1894 issue of *The Botanical Gazette* she reported on her collecting trip to Idaho in the summer of 1892. The intro to that article is shown here because it gives a good idea of the work being done at that time (albeit to the northwest of the Black Range):**

> **"Notes upon the northwestern and Rocky mountain flora. I. - In the summer of 1892 I made a very interesting trip in the northwest. The months of June, July and August were spent in Idaho. My work in that state was done in the sage brush of the southern part, in the Owyhee mountains to the southwest, and in the highlands, foothills and mountains of the central and eastern portions. I traveled by railroad to the principal points, and by stage, carriage or horseback to more distant ones. Of course I walked a good deal. I was well provided with letters of introduction, and there was seldom any difficulty in procuring company whenever desirable, which was necessarily a great part of the time.**



Anna Isabel Mulford

**During the entire season a collection of about eleven hundred species was made, two-thirds of which were from Idaho.**

**Many of these are interesting from the fact that they show new and unexpected localities, and many for showing variations developed under changed conditions. Some plants seem to be quite new. I have learned to regard Idaho as a meeting place of various floras. There one meets with subarctic plants from the north which can even be traced to Siberia, and the Cacti and other southern plants are common. There is a large desert flora and also moist thickets and meadows with a most luxuriant vegetation. The Rocky mountain plants meet those of California. In general, I should say that its vegetation is most nearly allied to that of the Pacific slope. I wish to express my appreciation of the kindness and encouragement I received both from my friends east of the Rockies, and from those I was so fortunate as to make in the state. Had it not been for their efficient assistance I could not have reached many of the distant and less accessible regions which I visited. Very special thanks are due to Drs. Bessey, Britton, Trelease and Coulter. They not only gave me the best sort of encouragement at the beginning of my trip, but have since extended to me the privileges of their respective herbaria and libraries. My interest and pleasure in the plants have been greatly increased by the very free use I have made of these fine opportunities, which have made my work possible."**

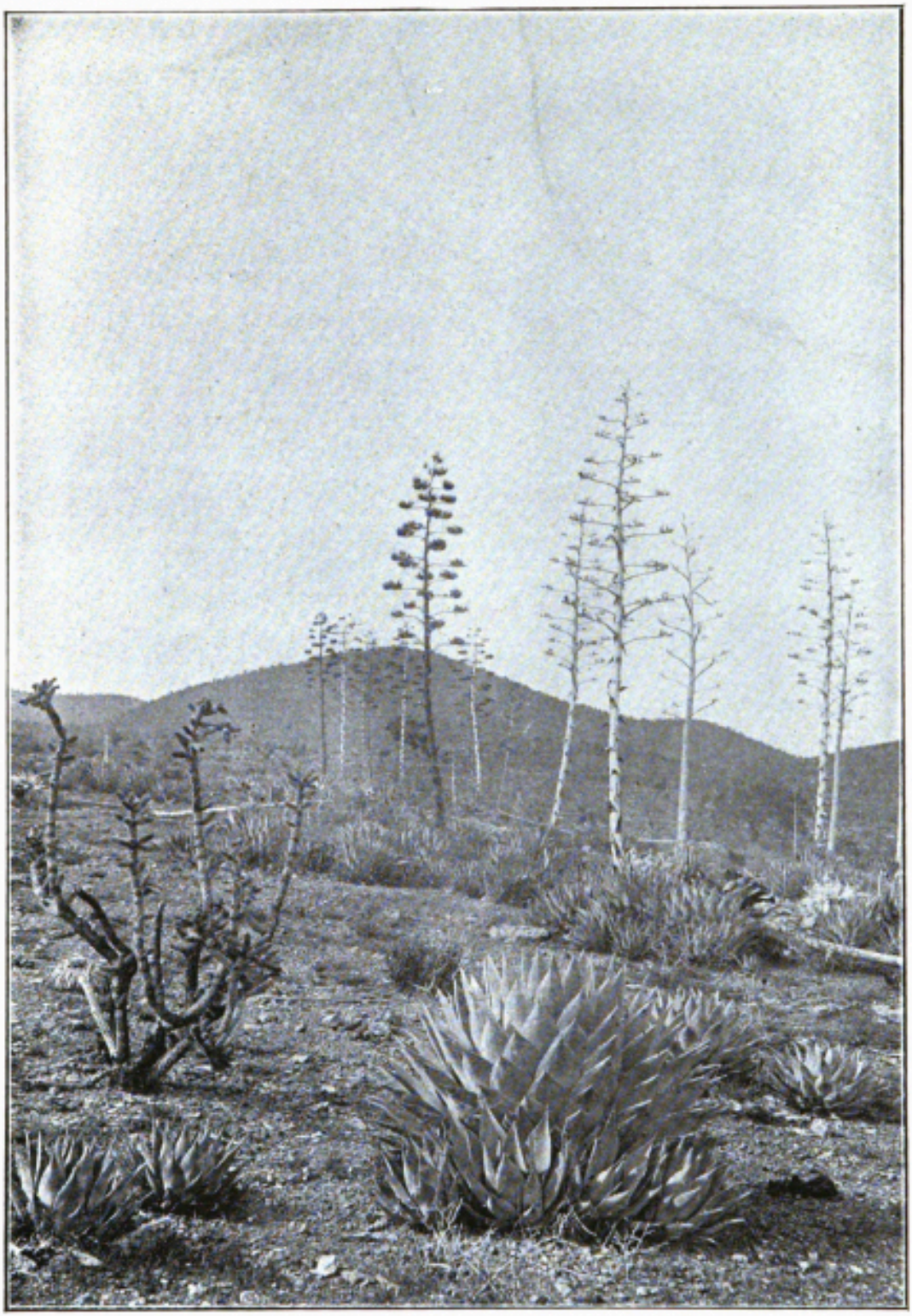
**In turn, Dr. Mulford provided us with the kindness of sharing her discoveries and knowledge.**



***Bouteloua aristiodoides*, collected in the Florida Mountains on August 27, 1895 (shown incorrectly in some data bases as 1995).**



***Aristida adscensionis*, collected at City of Rocks on September 4, 1895.**



AGAVE APPLANATA, VAR. PARRYI.

*Plate 38 from the cited work: A . applanata parryi. - From photograph taken by author near Copper Flats, New Mexico . Opuntia arborescens Engelm. is seen at the left . Anna Isabel Mulford.*

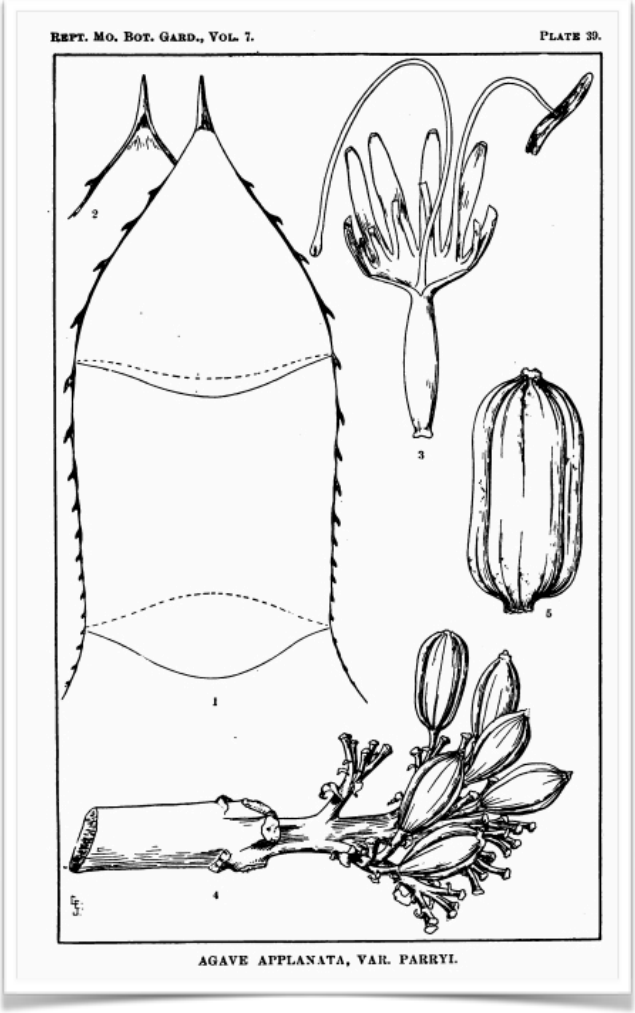



*Plate 39 from the cited work: "A . applanata parryi – 1. Outer side of leaf of medium sized plant, X; 2. end-spine and margin from face of leaf; 3. flower, showing insertion of stamens, X 1; 4. portion of fruiting branch, X 3; 5. capsule, X1. Leaf from plant sent to Garden from Pinos Altos Mts.; flowers and fruit from Copper Flats, New Mexico. All collected by author, Anna Isabel Mulford."*




Collected in the Florida Mountains, east of Deming. *Bouteloua barbata var. barbata. Shown with a collection date of August 1995 in data bases (should be 1895).* Anna Isabel Mulford

## Theodore Dru Alison Cockerell

Cockerell was Entomologist of the Experiment Station and Professor of Entomology and Zoology at the New Mexico College of Agriculture and Mechanical Arts (now NMSU) from 1893-1900. His assessment of the school is informative.

> *"Although the College was small, and did not reach the standards of a modern university, it was on the whole a stimulating place, and I think the students were well served. Owing to the combination of college and experiment station work, it was possible to have more specialists in the sciences than would have been found in other institutions of like size."* (pp. 379-380)

He published "The Bees of New Mexico" in *The Transactions of the American Entomological Society* (Vo.. 32, Number 3) August 1906. He noted that: "More species of bees are known from New Mexico than from any other State or Territory." (p. 389) He had published earlier works on the general topic.

He was especially well known for his work with fossilized insects, particularly those of the Florissant Fossil beds in Colorado. Demonstrating his extensive work in natural history, he has an author abbreviation in botany (Cockerell) and one in zoology (Ckll.). He published an autobiographical article in Bios, Vol. 6, No. 4 (December 1935), pp. 372-385.

Wooton and Standley's "*Descriptions of New Plants Preliminary to a Report Upon the Flora of New Mexico*" (1913) references Cockerll's collection at the Agricultural College.

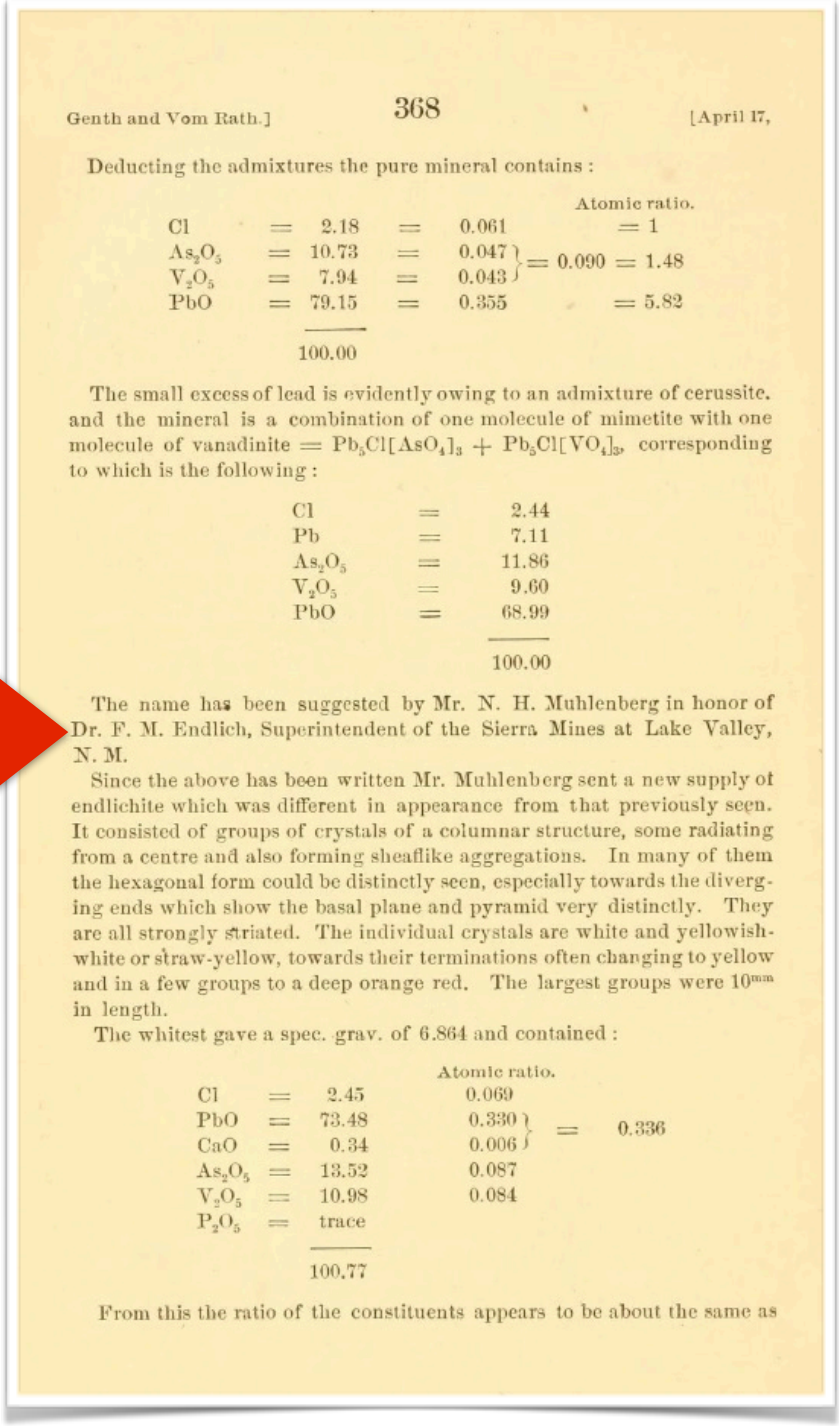
His collections are noted in a variety of works; for instance, it is noted that he collected the mosquito, *Culex impiger*, at Mesilla, New Mexico in, *Notes on the Mosquitoes of the United States*, 1900, L. O. Howard, USDA, Div. of Entomology.

## Frederic Endlich

**Dr. Frederic Miller Endlich was Superintendent of the Sierra Mines at Lake Valley, New Mexico, in the 1880's. In *The Proceedings of The American Philosophical Society*, Volume XXII (January to October 1885 – pp. 367-369), a description of a new species of mineral was made (see right). The mineral? Endlichite, named in honor of F. M. Endlich by N. H. Muhlenberg. Endlichite was found at the Sierra Bella and Sierra Grande mines.**

**The chemical composition of Endlichite is now understood as $Pb_5([V,As]O_4)_3Cl$ . Mineral "speciation" is as complex as biological speciation. Endlichite is now described as Arsenatian Vanadinite by some authorities and Vanadinite var. Endlichite by others. The [V,As] portion of the chemical formula describes the relationship between Vanadinite and Mimetite. V is the element Vanadium and As is the element Arsenic. If the mineral formula of a specimen is $Pb_5(VO_4)_3Cl$ then the mineral is Vanadinite. If the formula is $Pb_5(AsO_4)_3Cl$ then the mineral is Mimetite. An intermediate form $Pb_5([V,As]O_4)_3Cl$ is described as Endlichite. Yes, we are talking clinal mineralogy here.**

**Naming the mineral from Endlich was no mere whim. Endlich was a well established geologist and naturalist who found himself Superintendent of the Sierra Mines at Lake Valley at this particular time. Dr. Endlich (1851 - 1899), among many other things, did some early observational research on Big Horn Sheep in the Wind River Mountains of Wyoming. He was the first to observe that the sheep vary their coats depending on the season, hair in summer and wool in winter. (*Popular Science Monthly*, p. 764, October, 1878) By the end of 1878 he had published an article about the "Erupted Rocks of Colorado", "The Catalogue of Minerals Found in Colorado", and "Report on the Geology of the White River District" (a Report of the US Geological Survey of 1873). In the March 1882 issue of the *American Naturalist*, he published "Barbados - a Scientific Travelogue". I recognize these publications only to note that Endlich (and many other people who found themselves in the Black Range 150 years or so ago) was a person of some accomplishment. He was among other things a mineralogist at the Smithsonian Institution (which maintains his pocket compass as an artifact), an assistant on the Hayden geological surveys in the American West in the 1870's, and a member of the Philosophical Society of Washington (1873 to, at least, 1887) and published many articles in the Society's journal. His work was recognized internationally. For instance some of his publications are referenced in *A Catalogue of the Library of the Royal Geological Society of Cornwall* (1882). In Volume 17 of *The American Naturalist* he published "Mining Regions of Southern New Mexico" (pp. 149-157).**



Genth and Vom Rath.] 368 [April 17,

Deducting the admixtures the pure mineral contains :

| | | | | Atomic ratio. |
|---|---|---|---|---|
| Cl | = 2.18 | = | 0.061 | = 1 |
| $As_2O_5$ | = 10.73 | = | 0.047 | = 0.090 = 1.48 |
| $V_2O_5$ | = 7.94 | = | 0.043 | |
| PbO | = 79.15 | = | 0.355 | = 5.82 |
| | 100.00 | | | |

The small excess of lead is evidently owing to an admixture of cerussite, and the mineral is a combination of one molecule of mimetite with one molecule of vanadinite = $Pb_5Cl[AsO_4]_3 + Pb_5Cl[VO_4]_3$, corresponding to which is the following :

| | | |
|---|---|---|
| Cl | = | 2.44 |
| Pb | = | 7.11 |
| $As_2O_5$ | = | 11.86 |
| $V_2O_5$ | = | 9.60 |
| PbO | = | 68.99 |
| | | 100.00 |

The name has been suggested by Mr. N. H. Muhlenberg in honor of Dr. F. M. Endlich, Superintendent of the Sierra Mines at Lake Valley, N. M.

Since the above has been written Mr. Muhlenberg sent a new supply of endlichite which was different in appearance from that previously seen. It consisted of groups of crystals of a columnar structure, some radiating from a centre and also forming sheaflike aggregations. In many of them the hexagonal form could be distinctly seen, especially towards the diverging ends which show the basal plane and pyramid very distinctly. They are all strongly striated. The individual crystals are white and yellowish-white or straw-yellow, towards their terminations often changing to yellow and in a few groups to a deep orange red. The largest groups were 10mm in length.

The whitest gave a spec. grav. of 6.864 and contained :

| | | | Atomic ratio. | |
|---|---|---|---|---|
| Cl | = | 2.45 | 0.069 | |
| PbO | = | 73.48 | 0.330 | = 0.336 |
| CaO | = | 0.34 | 0.006 | |
| $As_2O_5$ | = | 13.52 | 0.087 | |
| $V_2O_5$ | = | 10.98 | 0.084 | |
| $P_2O_5$ | = | trace | | |
| | | 100.77 | | |

From this the ratio of the constituents appears to be about the same as

## Charles Henry Tyler Townsend

**Townsend travelled, studied, researched, and lived in much of the Americas. He was a famed entomologist, holding many posts. Of note for us is that in 1891-1892 he was a professor of zoology and entomology at the New Mexico College of Agriculture where he authored 90 publications and studied more than 400 insect species. (Over the course of his life he published more than 640 papers.) In 1892, he "traded places with Cockerell" (see previous page) who was the curator of the Public Museum of Kingston, Jamaica, at the time.**



Charles Henry Tyler Townsend

Townsend named and described more than 3,000 species of tachinid, one of the "fly" families. His taxonomic philosophy remains controversial today. He was a splitter who often made personal (verbal and written) attacks on those who disagreed with his determination.

He remained in Jamaica for two years, returning to Texas to do contract work for the Bureau of Entomology, studying the Cotton Boll Weevil threat when it first became obvious.

## Sidney Stuart Wilson

In Vol. 9, No. 6 (Nov. 30, 1897) of the *Wilson Bulletin,* Wilson listed "Some Common Birds of New Mexico" in southwestern New Mexico during the previous summer. Species included Curve-billed Thrasher, Cassin's Kingbird, Roadrunner, and House Finch.

Wilson did research at Fort Bayard during the summers of 1896 and 1897. In *The Auk*, XVI, pp. 188-189, 1899, "Some Additional New Mexican Birds", he listed 19 species which he observed in that area.

## Frank Stevens Maltby / George E. Coghill / William Haws Coghill

Maltby knew, and collected plants with, Herrick (see below), most notably in Western Mexico/Tres Marias Islands. NMSU maintains most of the 550+ specimens he collected during his life.

The Coghill brothers and Maltby, sometimes with Herrick, collected together, having great success in the upper Pecos. Many of their specimen sheets are also at NMSU.

## Clarence Luther Herrick

The second President of the University of New Mexico (1897-1901) was many things, including a geologist, ornithologist, neurologist, and botanist who published many papers on these topics. The fossil genus *Herrickiceras*, an ammonite, is named in his honor.

The term "polymath" is often overused. In the case of Herrick, it is a descriptive term. His writings were significant and varied. Below is a short excerpt from a listing of his publications. The publications list is several pages long. The range of topics is significant.

1899 Geology of the San Pedro and Albuquerque Districts. Bul. Hadley Lab. University of New Mexico. Vol. I., and Bul. Sci. Lab. Denison Univ., Vol. XI., pp. 93-116.
The Material Versus the Dynamic Psychology. Psych. Rev. Vol. VI., No. 2, pp. 180-187.
Editorial: Clearness and Uniformity in Neurological Descriptions. Journ. Comp. Neur., Vol. IX., pp. 150-152.
Notes on a Collection of Lizards from New Mexico. Bul. Sci. Lab. Denison Univ., Vol. XI., pp. 117-148, 11 plates. (With John Terry and H. N. Herrick, Jr.)
Geography of New Mexico. A Chapter in the Natural Advanced Geography. N. Y., Am. Book Co., 6 pp, map and 9 figures.
1900 Geology of the White Sands of New Mexico. Journ. Geol., Vol. VII., No. 2.
Miscellaneous Economic Papers. Salt, Gypsum, Cement, Clays, Graphite, in New Mexico. Bul. Hadley Lab. Univ. of New Mexico, Vol. II.
Identification of an Ohio Coal Measures Horizon in New Mexico. American Geologist, Vol. XXV, No. 4.
Geology of the Albuquerque Sheet. Bul. Hadley Lab. Univ. of New Mexico. Vol. II., Part 1., and Bul. Sci. Lab. Denison Univ., Vol. XI., pp. 175-239; 1 map and 32 plates.
Report of a Geological Reconnaissance in western Socorro, and Valencia Counties in New Mexico. Bul. Hadley Lab. Univ. of New Mexico. Vol. II., Part I., and American Geologist, Vol. XXV., pp. 331-346.
1901 Neurological Articles for Baldwin's Dictionary of Philosophy

Herrick was one of the earliest well-versed geologists in the Territory. A cadre of geologists from the United States Geologic Survey followed quickly and made major additions to our knowledge of the geology of New Mexico.

The NMSU Plant Collection includes specimens collected by Herrick.

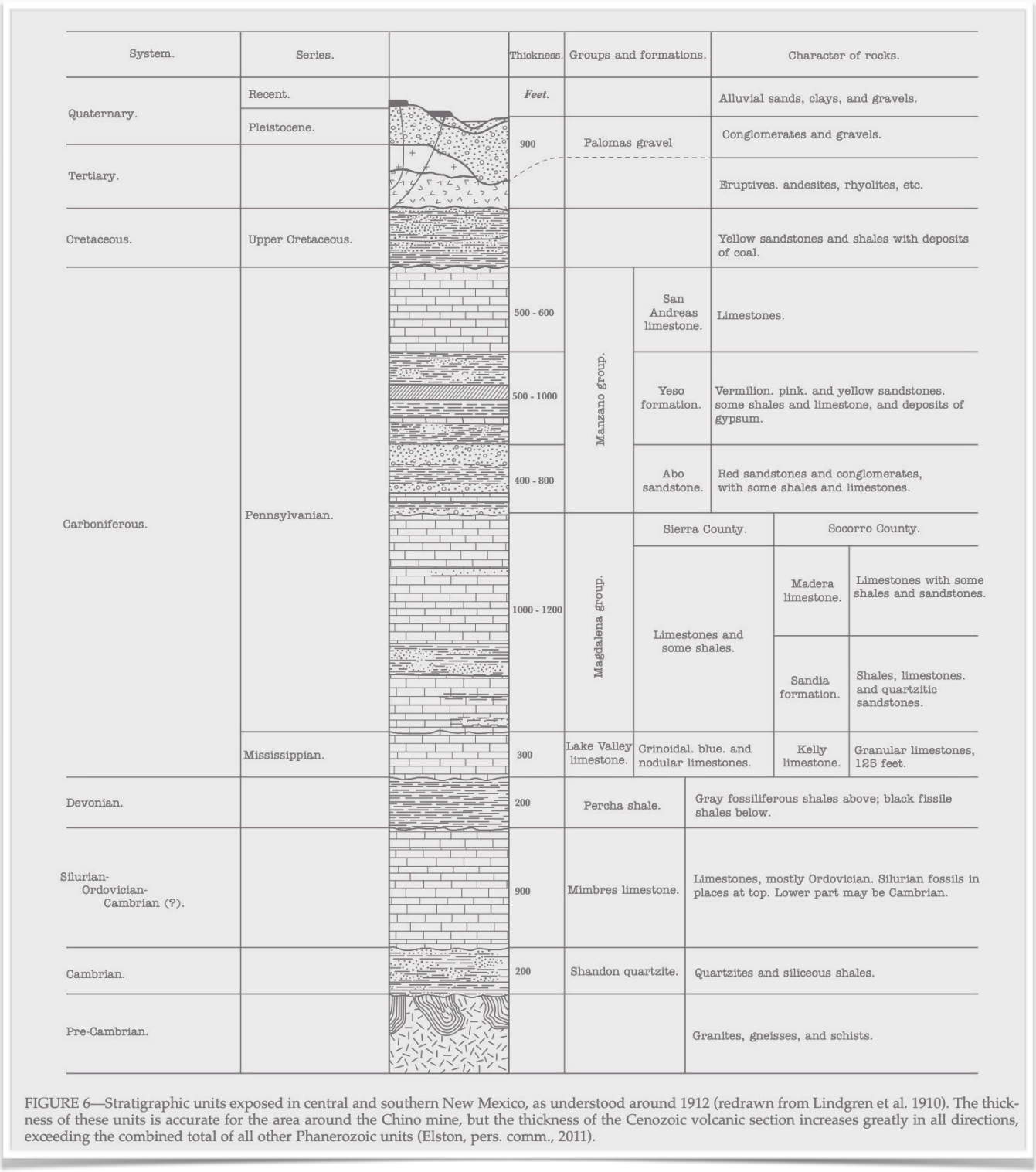



FIGURE 6—Stratigraphic units exposed in central and southern New Mexico, as understood around 1912 (redrawn from Lindgren et al. 1910). The thickness of these units is accurate for the area around the Chino mine, but the thickness of the Cenozoic volcanic section increases greatly in all directions, exceeding the combined total of all other Phanerozoic units (Elston, pers. comm., 2011).

**From "Celebrating New Mexico's Centennial - The Geology of New Mexico as Understood in 1912: An Essay for the Centennial of New Mexico Statehood, Part 2"; Barry S. Kues; University of New Mexico.**

## L. S. Storrs

**"Storrs (1902) surveyed the coal fields of the Rocky Mountains, including those being worked or known of in New Mexico – the Raton, La Plata, Mt. Taylor, Gallup, Cerrillos, Tejon (Hagan Basin), Jarillosa, Carthage, White Oaks, Mora County, and Gila River (northern Grant County) fields. He provided little information about each field, typically limited to a vague indication of stratigraphic position, number of producing beds, dip of the beds, and brief remarks on the grade of coal being mined. His survey illustrated how little was known of the geology of the territory's coal fields at this time." (*Celebrating New Mexico's Centennial - The Geology of New Mexico as Understood in 1912*: An Essay for the Centennial of New Mexico Statehood, Part 2", Barry S. Kues, University of New Mexico. p. 35)**

## O. B. Metcalfe

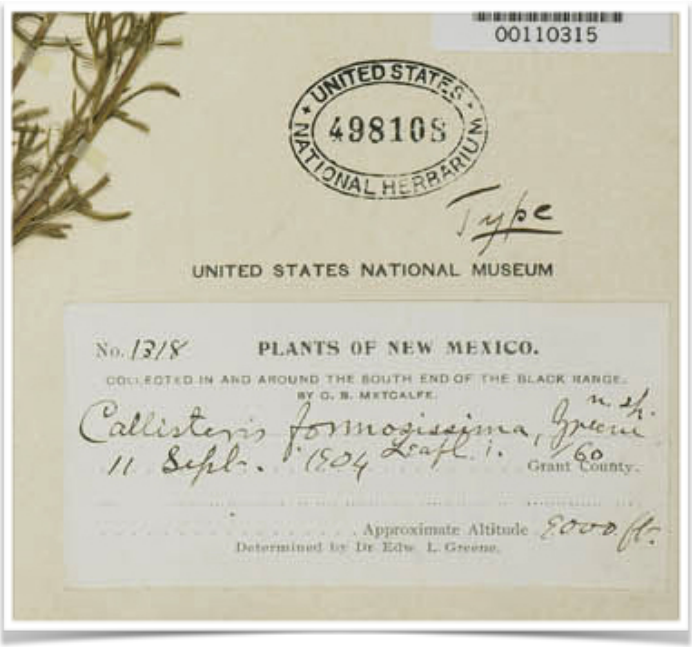
**The Black Range may be known for a great many things, but "firsts" is not one of them. That said, let us consider the Skyrocket, originally described as, *Callisteris formosissima*, a plant species that is very familiar to anyone who has spent time in the Range. And while we are at it, let us consider Orrick Baylor Metcalfe, generally known as O. B. Metcalfe.**

**Metcalfe collected many botanical specimens in the Black Range between 1902 and 1905. One of those specimens which he collected is shown right: the type specimen for Callisteris formosissima. The species description for the Skyrocket is based on this specimen, from about 9,000 feet in the Black Range, in 1904.**

**One test of a botanist's importance in the field is whether or not there are species names which recognize him/her in some manner. There are several species which now honor, or have honored, Metcalfe: *Senecio thurberi* was originally described as *Senecio metcalfei* - from a specimen Metcalfe collected at Hillsboro Peak; *Oxytropis lambertii var. bigelovii* was originally described as *Aragallus metcalfei* - from a specimen Metcalfe collected on Sawyer's Peak; and *Meibomia metcalfei* was originally described from a specimen Metcalfe collected in Animas Creek. If I take off my Black Range centric hat for a moment I should note that he is recognized in the names of several other species, generally in cases where he collected the type specimen.**






***Penstemon metcalfei*, Metcalfe's Penstemon (a.k.a. Metcalfe's Beardtongue), was described by Wooton and Standley and collected in the Black Range by Metcalfe. It is considered a rare plant in New Mexico. The linked webpage notes that "it is presently known from a small region of the Black Range in Trujillo and Percha Canyons from 6,600' to 9,500'. It is shown to the left in a photograph by Tom Todsen (see link). The ability of this species to survive, because of the effects of the 2013 Silver Fire, is a matter of concern.**

During 1904 and 1905, Metcalfe made Kingston his headquarters for his collection expedition. It was on July 6, 1904, that he collected the type specimen for the Southwestern Prickly Poppy, *Argemone p. pleiacantha*.

In the summer of 1904 and spring of 1905, Metcalfe collected several specimens in the southern end of the Black Range, including *Acacia constricta paucispina, Antennaria anacleta, Bidens cognata*…(the list is rather long and includes *Meibomia metcalfei*).

Note that many of the specimens collected by Metcalfe were "determined to species" by E. L. Greene. That is the case with the type specimen of *Ipomopsis (Callisteris ) aggregata* subsp. *formosissima,* Skyrocket, shown on the previous page. For a more extensive discussion of the collection work done by Metcalfe, in which Greene was the species determiner, see the write up on Edward L. Greene, earlier.

A nice summary of Metcalfe's collecting history was written by Roalson and Allred, in "A Floristic Study in the Diamond Creek Drainage Area, Gila National Forest, New Mexico" (*Aliso: A Journal of Systematic and Evolutionary Botany*: Vol. 17: Issue 1, Article 5).

> "Metcalfe made important collections in the vicinity of the Gila National Forest primarily between 1903 and 1905 (Standley 1910). In 1903 he collected in the Burro Mountains, at Mangas Springs, and in the Mogollon Mountains. In 1904 and 1905 Metcalfe made his Black Range collection. This included collections at Animas Creek, Hillsboro, Iron Creek, Kingston, and Santa Rita, as well as collections throughout the south end of the Black Range. Around this time he also made collections at Bear Mountain (near Silver City), at Cliff (northwest of Silver City on the Gila River), along the Gila River, and at Silver City (Standley 1910)." (Standley, P. C., 1910, The type localities of plants first described from New Mexico. *Contr. U.S. Natl. Herb.* 13: 143-227.)

Correspondence from Metcalfe to William Botting Hemsley at the Royal Botanic Gardens, Kew, (dated November 21, 1904) gives some insight into the "collecting business" and the success of Metcalfe as a collector. In that correspondence (Kew summary from their archives):

> "Metcalfe hastens to send the missing labels and is sorry to have put Hemsley to trouble. He has not had number 406 determined yet and cannot do it himself. He sent it to Dr E. L. Greene, but has not heard from him yet; he will let Hemsley know the name as soon as he can. Metcalfe has just returned from his season's work collecting in the Black Range, New Mexico. His collection was not much more than half as large as the one he made in the Mogollon Mountains, but he thinks it will be almost as interesting and he hopes to receive an order from RBG Kew for one of the sets. The set will probably contain about 450 numbers arranged and labelled in the same way as his 1903 collection, except that the collecting will be entirely determined by Greene. Greene did his first work near the region Metcalfe collected in this summer and reports that Metcalfe has obtained a number of his types which have never been described, as well as several new species. Greene has done more work, and and can no doubt do better work, on North Mexico plants than any other man. Metcalfe is offering his Black Range specimens for eight and a half cents each."

What else do we know about Metcalfe, other than that he was born (1879), collected for a few years in the Black Range, and died in 1936?

Metcalfe received his Bachelor of Science and Masters Degrees from New Mexico Agricultural College (now NMSU). He studied under Elmer Otis Wooton. His bachelor's thesis was "*The Flora of the Mesilla Valley*" and his master's thesis was on soil analysis and tension line in Mesilla Valley between saltbush and creosote bush.

In botanical circles he is known as a plant collector and ecologist. His collection at the National Herbarium was mentioned in Wooton and Standley's *Descriptions of New Plants Preliminary to a Report Upon the Flora of New Mexico* (1913).

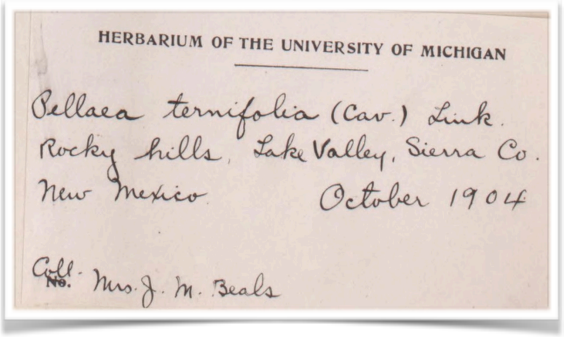
Following his education he lived in Mangas Springs and Silver City. After the collecting period described here he taught auto mechanics and had an auto business in Silver City. He also worked in mines and was killed in a mining accident in 1936.

## John Townsend Sharpless Hunn

During 1903-1905, Hunn collected in and near Silver City. He was an ornithologist. In October 2006 he published "Notes on Birds of Silver City, New Mexico" in *The Auk*, pp. 418-425), a listing of 112 species. Although his publications were few, he studied bird life in many places in the west and on the east coast. His only time in this area is noted above.

## Mrs. J. M. Beals

Plant collector in the Black Range, 1904-1914. Among the specimens she collected, five from Lake Valley are included in the *University of Michigan Herbarium* (*Astrolepis sinuata, Myriopteris fendleri, Myriopteris rufa, Notholaena standleyi*, and *Pellaea wrightiana* (all of these collected in 1904).


HERBARIUM OF THE UNIVERSITY OF MICHIGAN

Pellaea ternifolia (Cav.) Link.
Rocky hills, Lake Valley, Sierra Co.
New Mexico October 1904
Coll. Mrs. J. M. Beals
No.

## William Henry Bergtold

**Bergtold surveyed the headwaters of the Gila every year from 1905 to at least 1912. He published his findings in "October Birds of the Headwaters of the Gila River, New Mexico", *The Auk*, Volume 29, Number 3, July 1912, pp. 327-336. At page 330, he noted that ". . . difficulty of identification is increased by the inherent peculiarities of the local bird fauna: many bird races overlap here and at times it is absolutely impossible to place a given bird in its subspecific niche without shooting it". He lists records for 76 species.**

**In *The Auk,* Volume 29, No. 2 (April 1912), p. 237, Bergtold reported on collection of a Snowy Egret at "the junction of the East Fork of the Gila River, and Diamond Creek". A few years prior, he had reported one in the same general location (*The Auk*, Vol. 26, No. 1, p. 76) and one about 60 miles away in 1907.**

## James H. Gaut

**Gaut's field notes from 24 July 1901 to January 1906 (numbers 1 to 1108) include time spent in New Mexico. The record includes the number, sex, genera/latin binomial, locality, and date for each species he encountered. The notes are available at the Smithsonian Institution Archives. His focus was fauna, not flora.**

## Clarence A. Truholtz

**Truholtz was an Army surgeon who collected birds while at Ft. Bayard. John Hubbard reports that he has "located 28 specimens of bird eggs and skins collected at Fort Bayard between 26 May 1904 and 23 January 1913, all presumably by Truholtz." On May 31, 1907, he was at Ft. Bayard when he was summoned to Pinos Altos in a vain attempt to save a young woman from a morphine overdose (*Albuquerque Evening Citizen*) .**

## Clarence Birdseye

**Birdseye was collecting Fringed Bat, *Myotis thysanodes,* on the west base of the Mimbres Mountains in August 1908. He was in New Mexico between 1907 and 1909. In 1908-1909, he was employed by the Biological Survey as an Assistant Naturalist. (He went on to establish the frozen food industry. Yes, that Birdseye.)**

**On September 6/7, 1908, Birdseye and Vernon Bailey collected three specimens of *Myotis baileyi*, at "Luna, Gila National Forest, New Mexico". The species was first described by N. Hollister in 1909. The type specimen was collected near Ruidoso, by Hollister, in 1902. In 1928, Miller and Allen "determined" that *M.***



**Clarence Birdseye, 1910**

***baileyi* was a synonym for *M. occultus,* the other new species described by Hollister in his 1909 paper (see *M. baileyi* link, above). In 1967, *M. occultus* was subsumed within *M. lucifugus* as *M. l. occultus*, in a paper by James Findley and Clyde Jones (*"Taxonomic Relationships of Bats of the Species Myotis fortidens, M. lucifugus, and M. occultus", Journal of Mammalogy*, Vol. 48, No. 3, pp. 429-444.**

***Myotis lucifugus*, Little Brown Bat, has a large range. It is found in much of North America but is apparently limited to high elevation forests in Mexico. The individual shown below was photographed in Railroad Canyon, Black Range, New Mexico.**

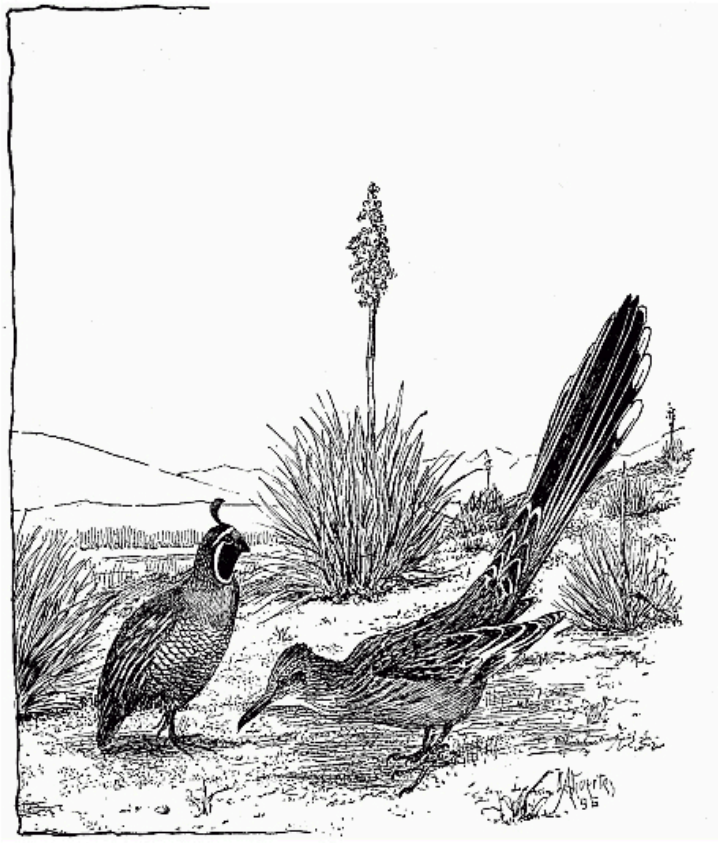


## Florence Augusta Merriam Bailey

**Florence Merriam published *Birds Through an Opera-Glass* in 1890. Many consider that publication to be the "first field guide in the modern tradition". She was very active in conservation efforts, helping to form both the Smith College Audubon Society and the Audubon Society of the District of Columbia. She was active in ending the use of feathers of wild birds in the millinery trade.**

**She traveled throughout the United States. In 1889 she made her first trip to the west (to San Diego) and traveled in Arizona and Utah with Harriet Mann Miller (Olive Thorne Miller), a well known author who wrote articles and books with a bird theme. Bailey's books were well received; her book *A-Birding on a Bronco* was the first book illustrated by Louis Agassiz Fuertes. One of the drawings from the book is shown below.**

**Among her many works was *Handbook of Birds of the Western United States*, published in 1902. It remained a standard reference for 50 years. Starting in 1903, she and her husband traveled throughout New Mexico studying natural history generally and ornithology particularly. She was with Vernon Bailey on the trip described in the field notes which follow. In 1928, she published *The Birds of New Mexico*, which is considered a classic. It includes an extensive description of the work done in this area by wife and husband. She received the Brewster Medal (the American Ornithologists' Union Award for an exceptional body of work) for *The Birds of New Mexico* in 1931. This was the sixth time it had been awarded.**



Valley Quail and Road-Runner.

**Bureau of Biological Survey**
**From "The Survey" November 1928**

**"Birds of New Mexico Published. On November 15 there was issued a volume based in part on investigations that had their inception during the early years of the Biological Survey. This is a report on the *Birds of New Mexico* a book of more than 800 pages in which are brought together in attractive form the principal facts that have become known on this group of wild creatures.**

**The book appears under the authorship of Mrs. Florence Merriam Bailey, sister of Dr. C. Hart Merriam, first chief of the Biological Survey and wife of Vernon Bailey, field naturalist of the Division of Biological who did the first field work in the state in 1889. Later these efforts were supplemented by extensive explorations by both Mr. and Mrs. Bailey and by many other workers. The data of others, published and unpublished, have also been freely drawn upon, the earliest being from the Spanish adventurer Coronado, who in 1540 found in the wild turkey of New Mexico a welcome addition to his larder. The late Wells W. Cooke, an assistant biologist of the Survey, who died in 1916, had made a beginning on the work of collecting the mass of information that is detailed in this book and his labors are recognized on the title page and in special sections. The book is prefaced with a historical statement by Mr. Redington of the part the Biological Survey has had in the work from the time of its inception**

**The book is profusely illustrated with 25 new color plates, numerous cuts in black and white from photographs and drawings, including 60 maps of distribution of species prepared in the Bureau. The color plates consist of a map of the life zones of the State, also prepared in the Biological Survey, one hitherto unpublished color plate by the late Louis Agassiz Fuertes, and 23 plates illustrating numerous species of the birds of New Mexico from drawings specially made for this work by the bird artist, Allan Brooks. Publication was under the auspices of the New Mexico Department of Game and Fish in cooperation with the State Game Protection Association and the Biological Survey with 'the generous cooperation of other interested organizations and individuals of Now Mexico'."**



**Florence Augusta Merriam, 1886.**

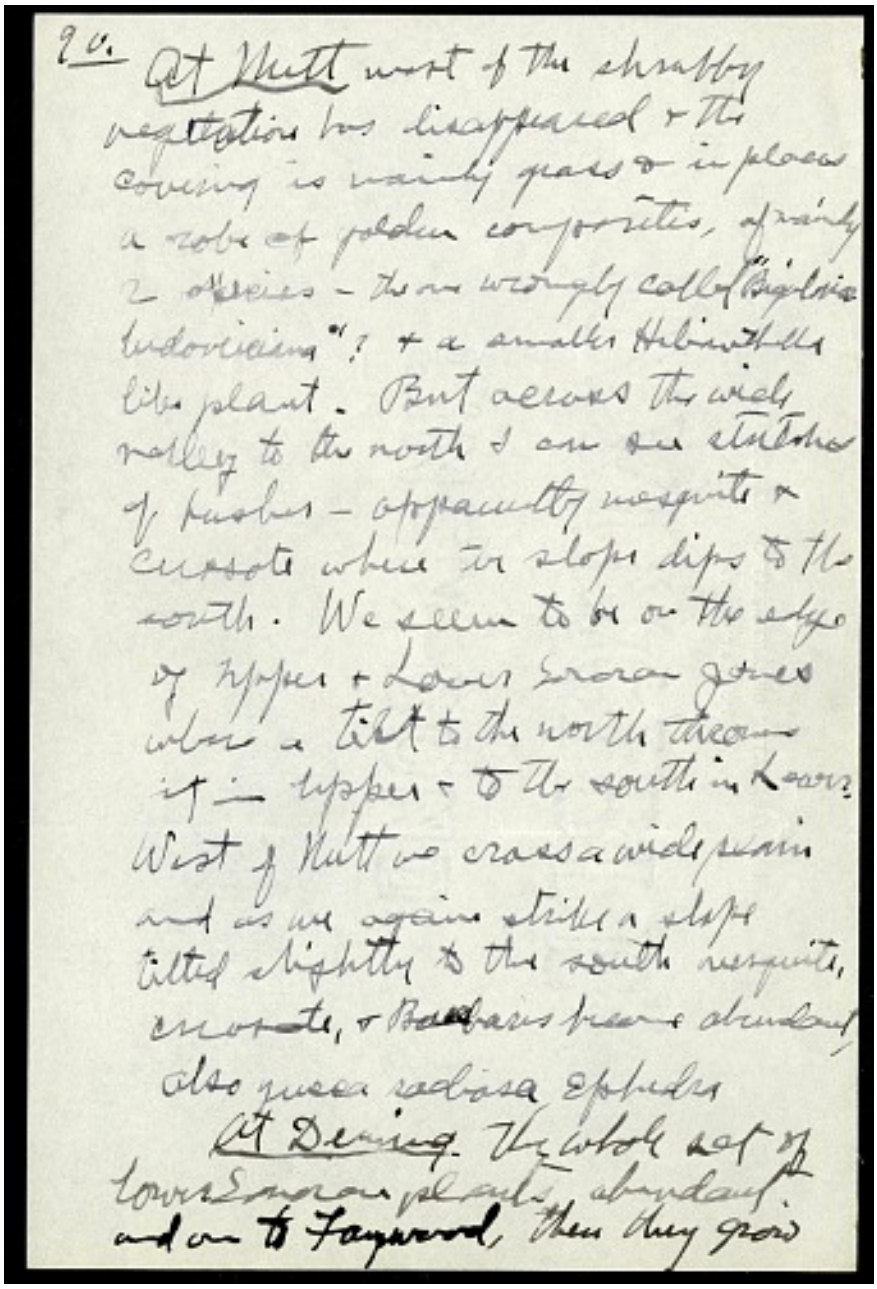
## Vernon Orlando Bailey

Bailey began collecting for C. Hart Merriam and the Bureau of Biological Survey when it was founded. Merriam was the first head of the Survey. In 1887, Bailey was appointed special field agent to the Division of Economic Ornithology and Mammalogy. In 1890 he was appointed Chief Field Naturalist, retiring from that position in 1933. He was president of the American Society of Mammalogists from 1933 to 1934.

In 1899, he married ornithologist Florence Augusta Merriam. Both collected specimens on their travels.

During his career Bailey provided the Bureau with roughly 13,000 species, many never described before. He published 244 monographs and articles while with the USDA. His biological surveys of Texas, New Mexico, North Dakota, and Oregon were landmark publications.

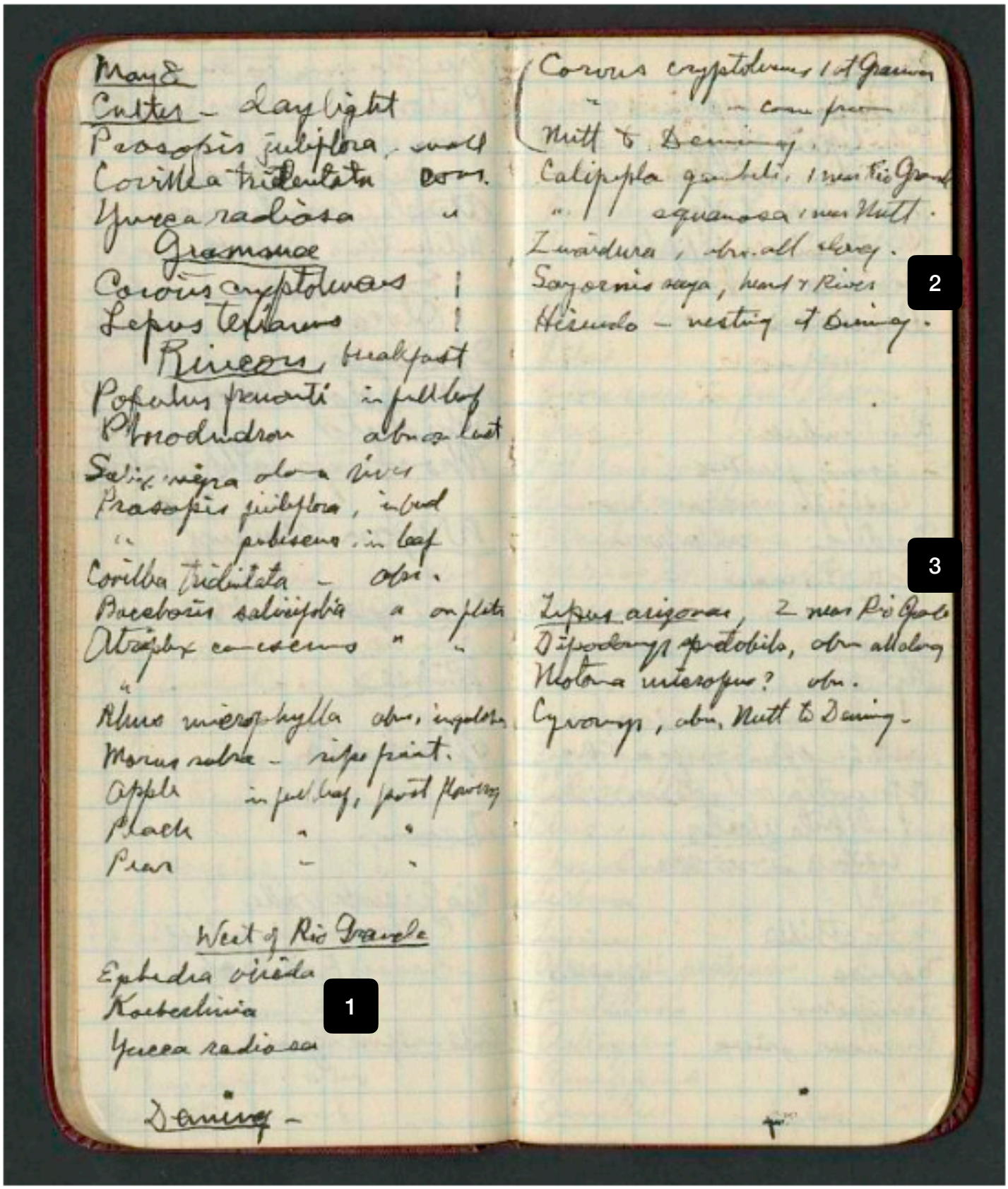
From May 8 to June 2, 1906, Bailey traveled in and near the Black Range. His field notes for this period follow. He also kept a journal during this period; a few excerpts from the journal are included on this page. The transcription of these field notes is provided by the Smithsonian Digital Volunteers: Transcription Center. In November of that year he was back in this area.


9 a. At Nutt most of the shrubby vegetation has disappeared & the covering is mainly grass & in places a robe of golden composites, of mainly 2 species – the one wrongly called "Bigelovia ludoviciana"? & a smaller Helianthella like plant. But across the wide valley to the north I can see stretches of bushes – apparently mesquite & creosote where the slope dips to the south. We seem to be on the edge of Upper & Lower Sonoran zones where a tilt to the north throws it in Upper & to the south in Lower. West of Nutt we cross a wide seam and as we again strike a slope tilted slightly to the south mesquite, creosote, & Barbaris became abundant also yucca radiosa Ephedra
At Deming. The whole set of lower Sonoran plants abundant and on to Faywood, then they grow

The writing in his journal takes some work to decipher. The entry from May 8 (at Nutt and Deming) is an example. But, it is full of insight and worth the effort. It includes entries like:

- "Two turkey buzzards seen near Spalding";
- "Woodrat browses on –- in mesquite bushes up slope west of Rincon and in places half or more of the surrounding bushes have been stripped of bark and killed.";
- "The break from Lower to Upper Sonoran comes between Faywood and White Water in the open valley, though the –- south slopes above carry traces of Lower Sonoran higher up.";
- "Reached Silver City at noon and went to the Broadway Hotel. The town is in a barren gulch between barren hills, but with a south slope.";
- "From the hill back of town (ed. Silver City) the black timber of the Forest Reserve shows not far to the north.";
- "May 11. Left Silver City for the GOS Ranch at 7:30, raining and squally. Came through Central, which is about to Ft. Baird then through Santa Rita then over the ridge and down onto the Mimbres at the old town of Mimbres, then about 11 miles up the river and over onto the head of Sappillo Creek and down it a few miles to the G.O.S. Ranch, a beautiful place in wide park like valley, the Sappillo is a branch of the Gila. Came 40 miles from Silver City, but in a round about way. The country is rough and woods are scarce, steep and stony in places, most of the country is dry but there is a little water in the creeks at Silver, Central, and Santa Rita and the Mimbres is a pretty little river too wide to jump across.";
- "May 12. With Mr. Leavenworth, I rode down the canyon 4 or 5 miles to look for wolf tracks, but found only old tracks."; and
- "May 16. No wolf tracks on the mesa this morning. Started for my traps just as the sun touched the hill tops and got back at 9 a.m…afternoon went down the river about 3 miles and set 3 wolf traps, two in the main canyon and up in Powderhorn Canyon…"

Much of the work done by the Bureau of Biological Survey was "economic biology"; ridding the west of "vermin" was a priority.

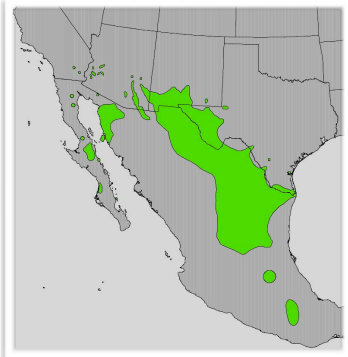



**Field notes of Vernon Bailey, May 8, 1906. Starting with Cutter/Graminae/Rincon. Lower left: "West of Rio Grande, *Ephedra virida, Koeberlinia, Yucca radiosa*" "Deming"; Upper Right: (Continuation of Deming) - *Corvus cryptoleucus*" "*Nutt to Deming - Calipepla gambili, 1 near Rio Grande; Calipepla (indicated by ditto mark) squamosa, 1 near Nutt. Zuraidura, abn. all along. Sayornis saya, heard at River. Hirundo - nesting at Deming; Lepus arizonae, 2 near Rio Grande, Dipodomys spectabilis, abn all along, Neotoma micropus? (Ed: Calipepla gambili = Callipepla gambelii/Calipepla squamosa = Callipepla squamata)*" Here and elsewhere the transcription was performed by the Smithsonian Institution.**



*2. Say's Phoebe, Sayornis saya, photographed near Hillsboro, New Mexico.*





**1. (Above) *Koeberlinia spinosa* var. *spinosa*, Crown of Thorns or Crucifixion Thorn, Apache Peak N. of Lake Valley, Black Range, New Mexico, April 14, 2020. The range of this species barely extends into the United States (map to the right - U.S.G.S. - Elbert L. Little, Jr.). This species may have been of particular interest to Bailey.**



**3. Desert Cottontail, *Sylvilagus audubonii*, (right) from Warm Springs Wash, east of Hillsboro, New Mexico. This species is also known as Audubon's Cottontail and *Conejo Del Desierto*. *Lepus arizonae* is a synonym for the subspecies *S. a. arizonae*.**

**LEFT PAGE**

Deming
Prosopis juliflora abn*
Chilopsis saligna com**
Yucca radiosa abn
Ephedra, tall green (Ditto for: abn)
Artemissia filifolia (Ditto for: abn)
Covillea
Baccharis

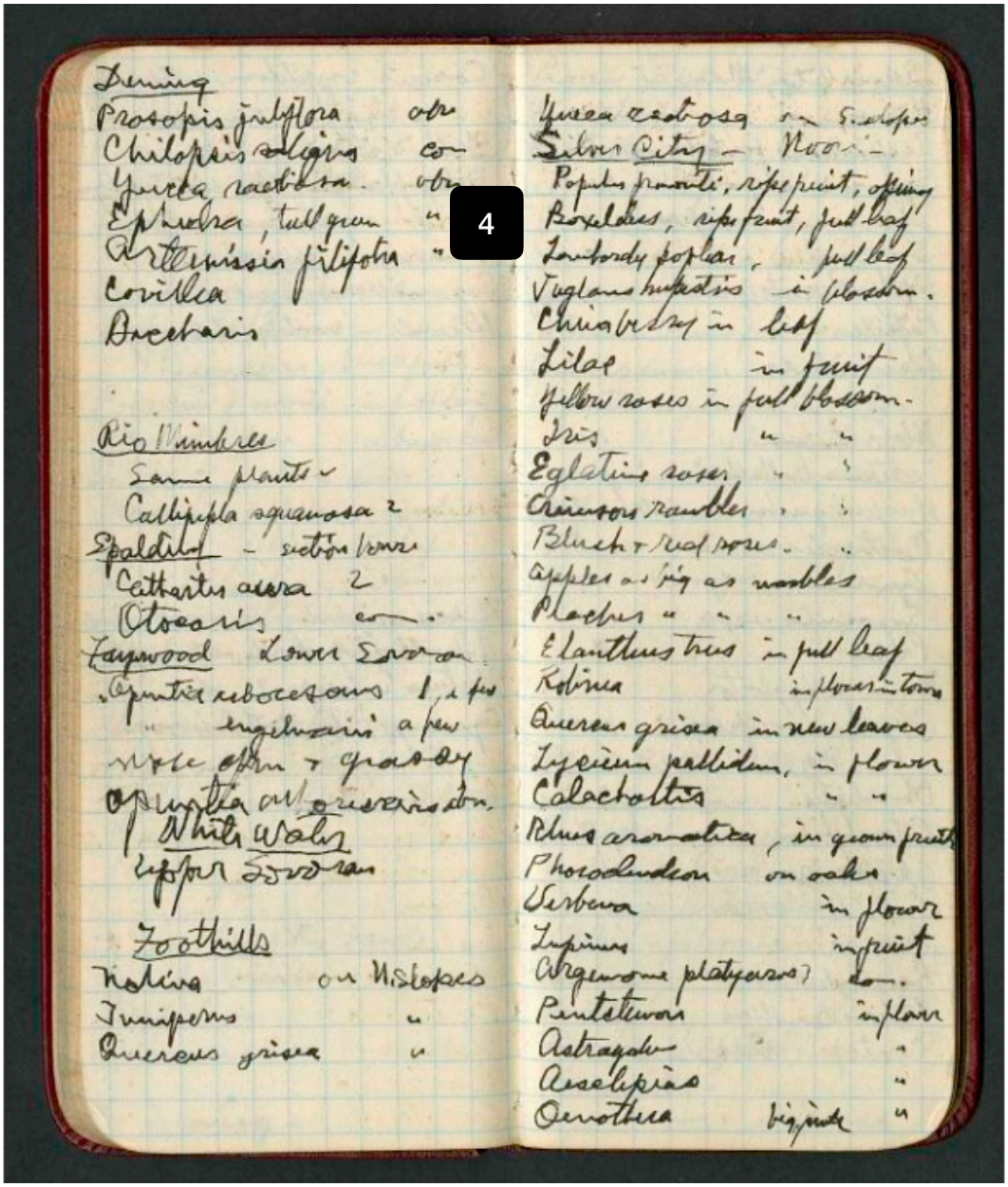
Rio Mimbres
Same plants √
Callipepla squamosa 2
Spalding*** - section house
Cathartis aura 2
Otocoris com
Faywood - Lower Sonoran
Opuntia arborescens 1, a few
(Ditto: Opuntia) engelmani - a few more open & grassy
Opuntia arborescins abn.
White Water
Upper Sonoran

Foothills
Nolina on N. Slopes
Juniperus (Ditto for: on N. Slopes
Quercus grisea (Ditto for: on N. Slopes

* abn = abundant
** com = common
***Spalding is a railroad siding

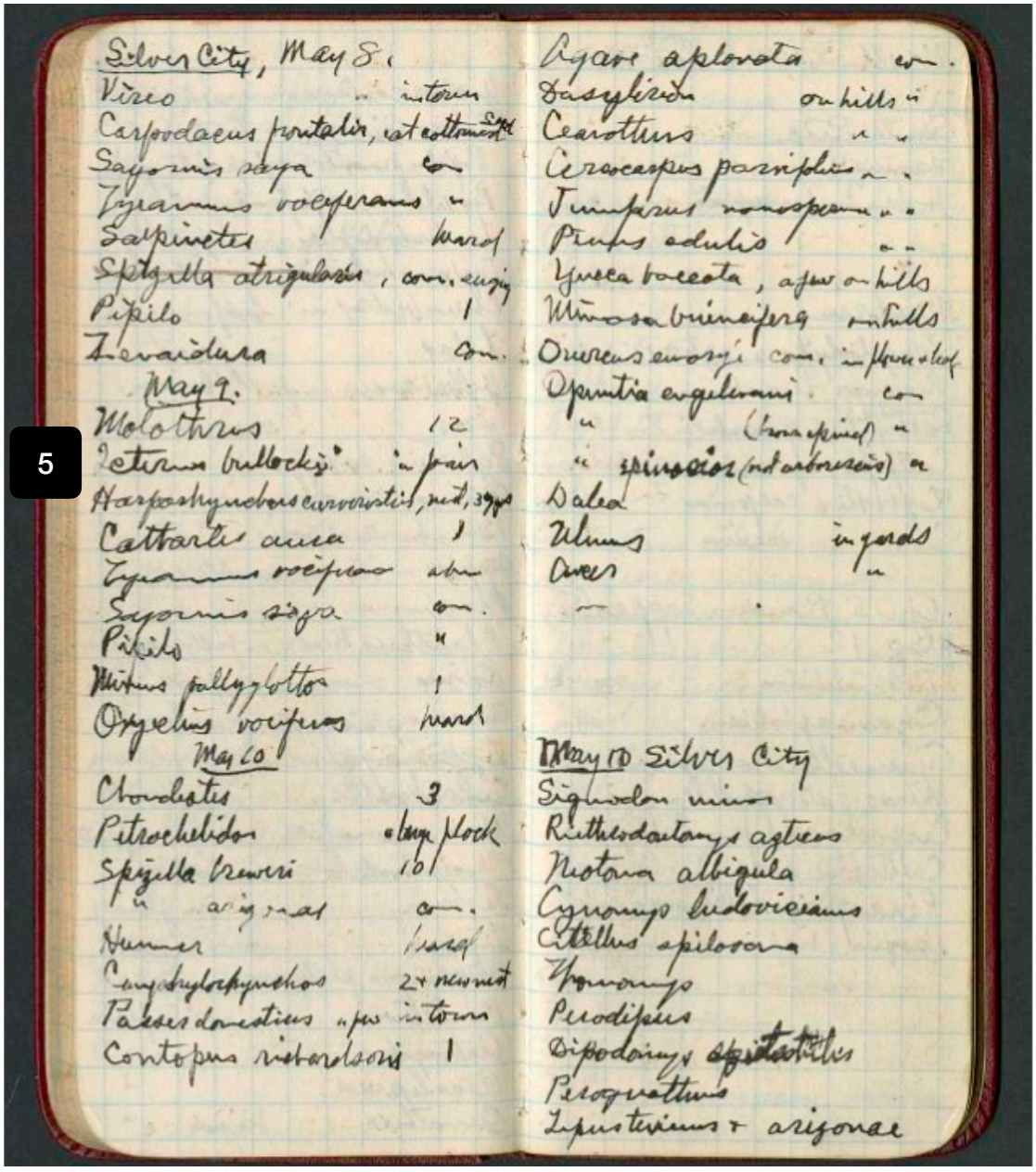
**RIGHT PAGE**

Yucca radiosa on S. slopes
Silver City - Noon -
Populus fremonti, ripe fruit, opening
Boxelders, ripe fruit, full leaf
Lombardy poplar, full leaf
Juglans rupestsis in blossom
Chinaberry in leaf
Lilac in fruit
Yellow roses in full blossom
Iris (Dittos for: in full blossom)
Eglatine roses (Dittos for: in full blossom)
Crimson rambler (Dittos for: in full blossom)
Blush & red roses (Dittos for: in full blossom)
Apples as big as marbles
Peaches (Dittos for: as big as marbles]]
Elanthus trees in full leaf
Robinea in flower in town
Quercus grisea in new leaves
Lycium pallidum in flower
Calachortis (Ditto for: in flower)
Rhus aromatica, in green fruits
Phorodendron on oaks
Verbena in flower
Lupinus in fruit
Argemone platyceras? com
Pentstemon in flower
Astragalus (Ditto for: in flower)
Aesclepias (Ditto for: in flower)
Oenothera big frute? (Ditto for: in flower)






4. Mormon Tea, *Ephedra trifurca*, South of Hillsboro, New Mexico, May 3, 2014




5



5. Bullock's Oriole, *Icterus bullockii,* Hillsboro, New Mexico, June 29, 2020. Then, as now, separated from Baltimore Oriole. Between then and now the two species were lumped together as Northern Oriole.

**LEFT PAGE**

Silver City, May 8
Vireo in town
Carpodacus frontalis, eat cottonwood seed
Sayornis saya com
Tyrannus vociferans (Ditto: com)
Salpinctes heard
~~Spizella atrigularis~~, com. singing
Pipilo 1
Zenaidura com
May 9
Molothrus 12
Icterus bullockii a pair
Harporhynchus curvirostris, nest 3 eggs
Cathartes aura 1
Tyrannus vociferous abn
Sayornis saya com
Pipilo (Ditto for: com)
Mimus polyglottos 1
Oxyrelius vociferous heard
May 10
Chordestes 3
Petrochelidon a large flock
Spizella breweri 10
(ditto: Spizella) arigonae com
Hummer heard
Carphylorhynchos 2 + new nest
Passer domesticus a few in town
Contopus richardsoni 1

**RIGHT PAGE**

Agave aplonata com
Dasylirion on hills (Ditto: com)
Ceanothus (Dittos: on hills com)
Cercocarpus parvifolius (Dittos for: on hills com)
Juniperus anospermum (Dittos for: on hills com)
Pinus edulis (Dittos for: on hills com)
Yucca baccata, a few on hills
Mimosa biuncifera on hills
Quercus emoryi com. in flower & leaf
Opuntia engelmani com
(Ditto for: Opuntia) (brown spined) (Ditto for: com)
(Ditto for: Opuntia) spinosior (not arborescens) (Ditto for: com)
Dalea
Ulmus in yards
Acer (Ditto for: in yards)

May 10 Silver City
Signodon minor
Reithrodontomys aztecus
Neotoma albigula
Cynomys ludovicianus
Citellus spilosoma
Thomomys
Perodipus
Dipodomys spectabilis
Perognathus
Lepus texianus & arizonae

**LEFT PAGE**

<u>May 11</u> **Silver City, 7:30**

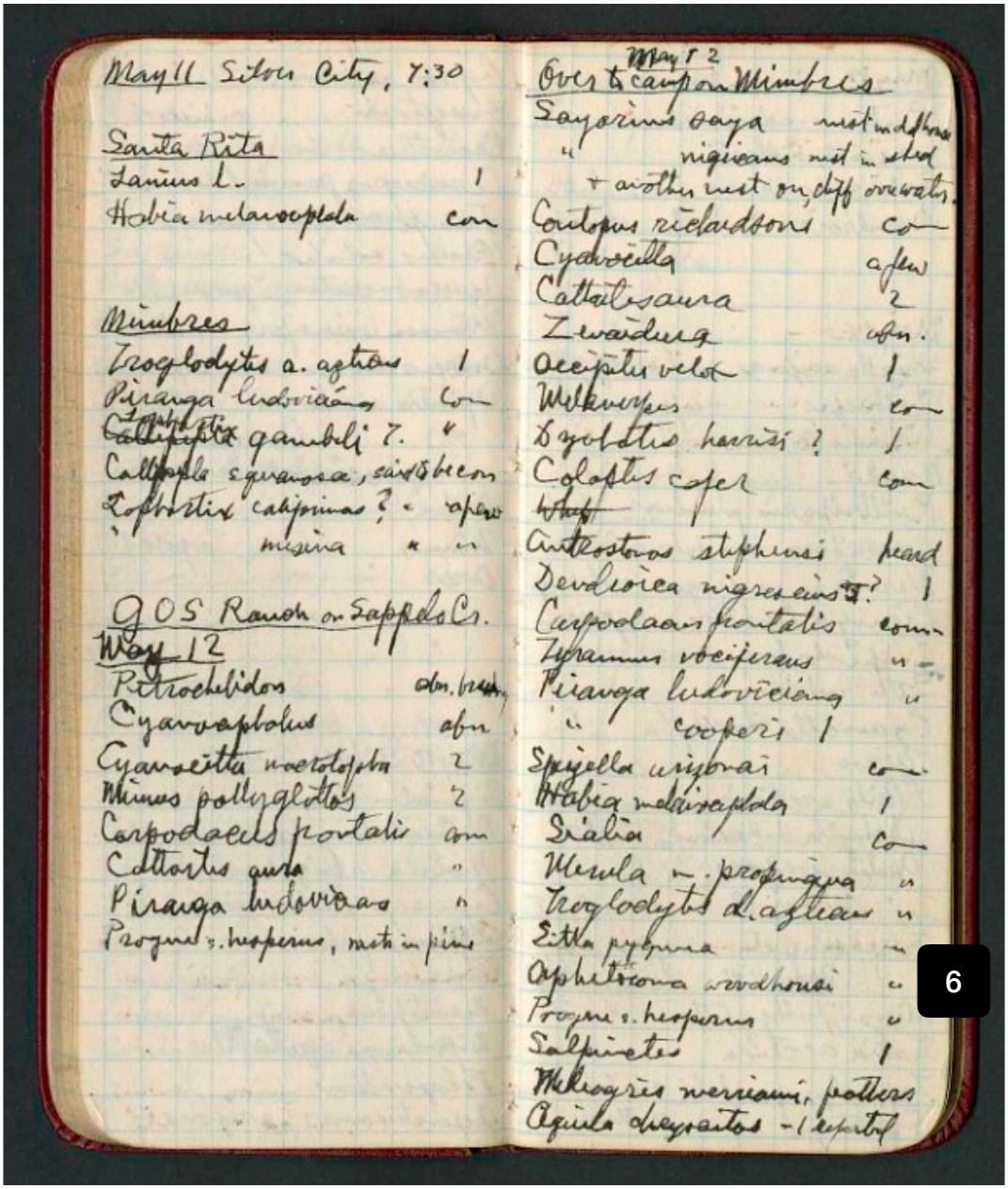
<u>Santa Rita</u>
**Lanius l. 1**
**Habia melanouplala com**

<u>Mimbres</u>
**Troglodytes a. aztecus 1**
**Piranga ludoviciana com**
**~~Callipipea~~ Lophostrix gambeli 7.**
**(Ditto for: com)**
**Callipepla squamosa, said to be com**
**Lophostrix californias (Ditto for: said to be com) a few**
**(Ditto for: Lophostrix) mesina**
**(Ditto for: said to be com) a few**

<u>GOS Ranch on Sappelo Cr</u>
<u>May 12</u>
**Petrochilidous abn. breeding**
**Cyanocephalus abn**
**Cyanocitta macrolopha 2**
**Mimus pollyglottos 2**
**Carpodacus portalis com**
**Cathartes aura (Ditto for: com)**
**Piranga ludoviceana (Ditto for: com)**
**Progne s. hesperus, nests in pine**

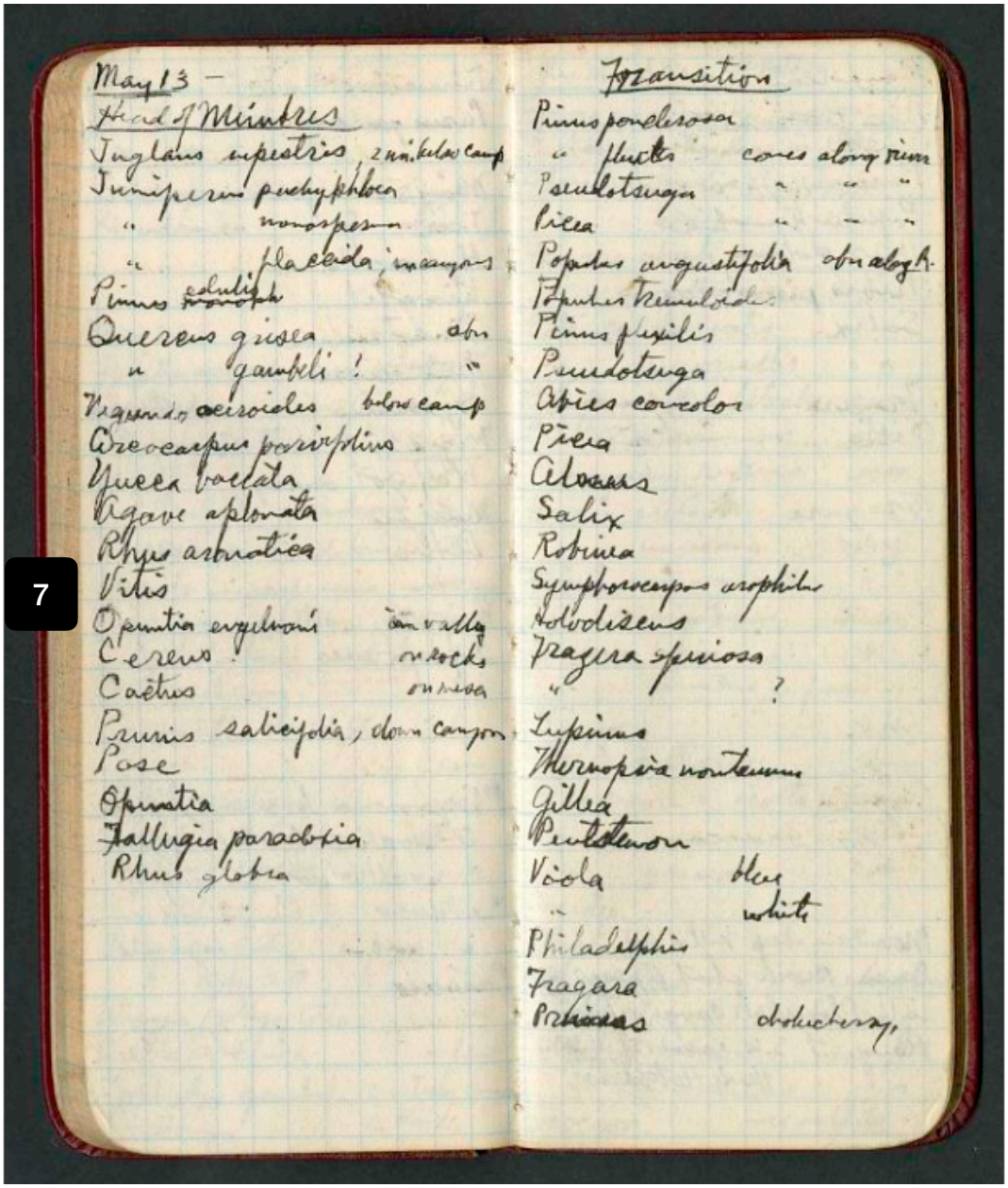
**RIGHT PAGE**

<u>May 12</u>
<u>Over to camp on Mimbres</u>
**Sayorius saya nest in old house**
**(Ditto for: Sayorius) nigricans nest in shed & another nest on cliff over water.**
**Contopus richardsoni com**
**Cyanocitta a few**
**Cathartes aura 2**
**Zenaidura abn.**
**Accipiter velox 1**
**Melkverpes? com**
**Dryolates harrisi 1**
**Colaptes cafer com**
**~~Whip~~**
**Antrostomus stephensi heard**
**Dendroica nigrescens ~~?~~ 1**
**Carpodacus frontalis com**
**Tyrannus vociferous (Ditto for: com)**
**Piranga ludoviciana (Ditto for: com)**
**(Ditto for: Piranga) cooperi 1**
**Spizella arizonai com**
**Habia melairaplala 1**
**Sialia com**
**Merula propinqua (Ditto for: com)**
**Troglodytes d. aztecas (Ditto for: com)**
**Sitla pygenia (Ditto for: com)**
**Aphelocoma woodhousi (Ditto for: com)**
**Progne s. hesperus (Ditto for: com)**
**Salprinctes 1**
**Meleagris merriami, feathers**
**Aquila chrysaetos - 1 reported**






**6. Woodhouse's Scrub-Jay, *Aphelocoma woodhouseii*, formerly considered a subspecies of what was then the Western Scrub-Jay, Hillsboro, New Mexico, 11/25/17. *Aphelocoma* refers to the lack of a crest on this jay (*apheles* = smooth and *kome* = hair of the head). In 1907 this species was called Scrub-Jay and included the species now called California, Island, Florida, and Woodhouse's Scrub-Jay.**




7

**7.** ***Vitis arizonica,*** **Canyon Grape, is commonly found in the area.**

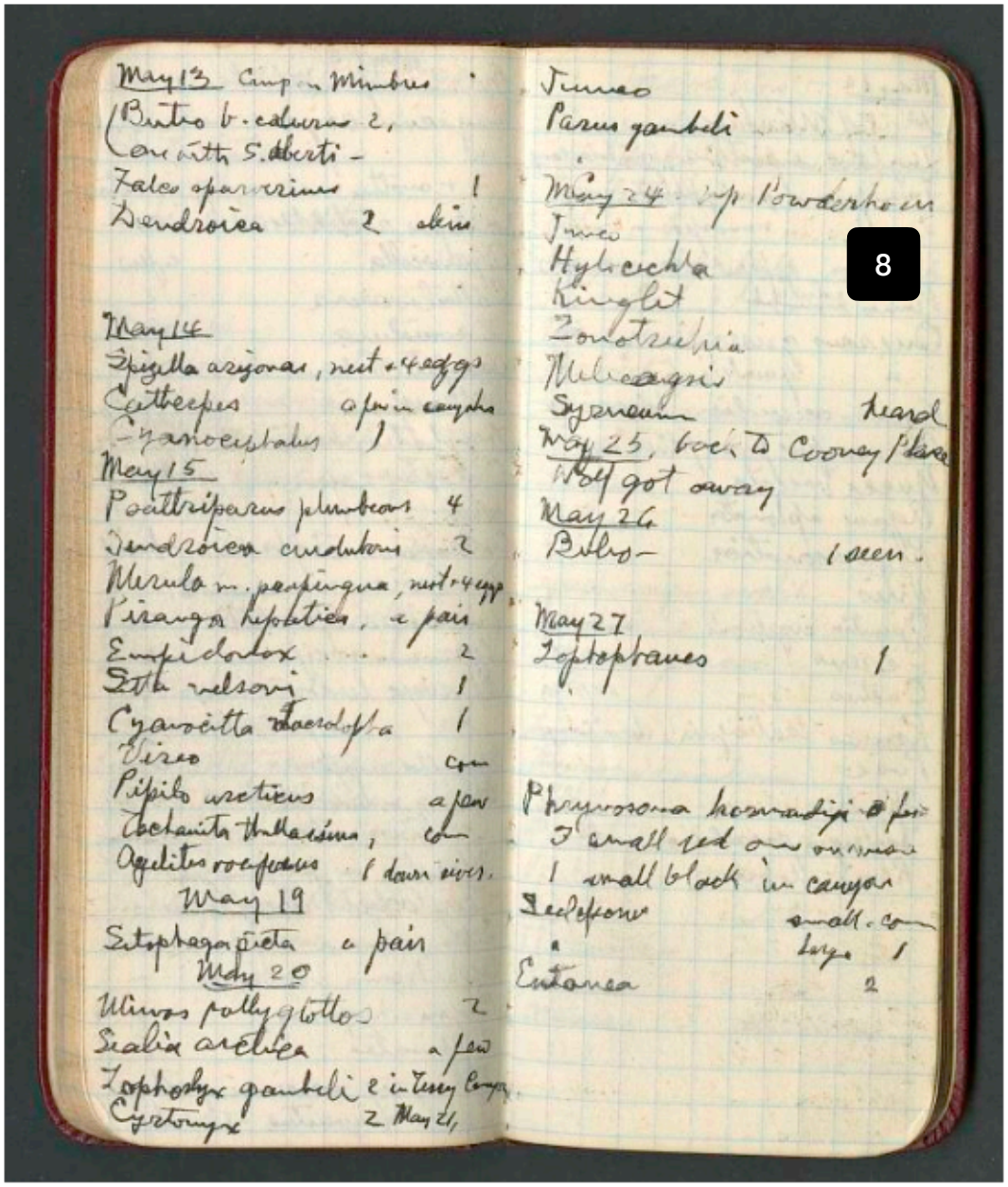


**LEFT PAGE**

May 13 -
Head of Mimbres
Juglans inpestris, 2 mi. below camp
Juniperus puchyphloca
(Ditto for: Juniperus) monosperma
(Ditto for: Juniperus) flaccida, in canyons
Pinus ~~monoph~~ edulis
Quercus grisea abn
(Ditto for: Quercus) gambili (Ditto for: abn)
Nigundo aciroieles below camp
Arcocarpus parvifolius
Yucca baccata
Agave aplonata
Rhus aronatica
Vitis
Opuntia engelmani in valley
Cereus on rocks
Cactus on mesa
Prunis salicifolia, down canyon
Pose
Opuntia
Fallugia paradoxia
Rhus globia

**RIGHT PAGE**

Transition
Pinus ponderosa
(Ditto for: Pinus) flexilis cones along river
Pseudotsuga (Ditto for: cones along river)
Picea (Ditto for: cones along river)
Populus angustifolia abn along R.
Populus Tremuloides
Pinus flexilis
Pseudotsuga
Abies concolor
Picea
Aloneus
Salix
Robinia
Symphaorocorpos arophilus
Holodiseus
Frazera spiriosa
(Ditto for: Frazera) ?
Lupinus
Thermopira nontemmu
Gillea
Penstemon
Viola blue
(Ditto for: Viola) white
Philadelphis
Fragara
Prunus chokecherry




**LEFT PAGE**

May 13 [Camp in Mimbres
Buteo b. calverus 2
one with S. alberti
Falco sparverius 1
Dendroica 2 skins

May 14
Spizella arizonas, nest & 4 eggs
Catherpes few in canyons
Cyanocephalus 1
May 15
Psattriparus plumbeous 4
Dendroica auduboni 2
Merula m. propingua, nest & 4 eggs
Piranga hepatica, a pair
Empidovox ... 2
Sitta nelsoni 1
Cyanocitta macrolopha 1
Vireo com
Pipilo arcticus a few
Tachanita thallassina, com
Agelitos vociferous 1 down river
May 19
Setophagapicta a pair
May 20
Mirvas pollyglottos 2
Sialia arctica a few
Zophoslyx gambili 2 in Terry Canyon
Cyrtorugx 2 May 21,

**RIGHT PAGE**

Junco
Parus gambili

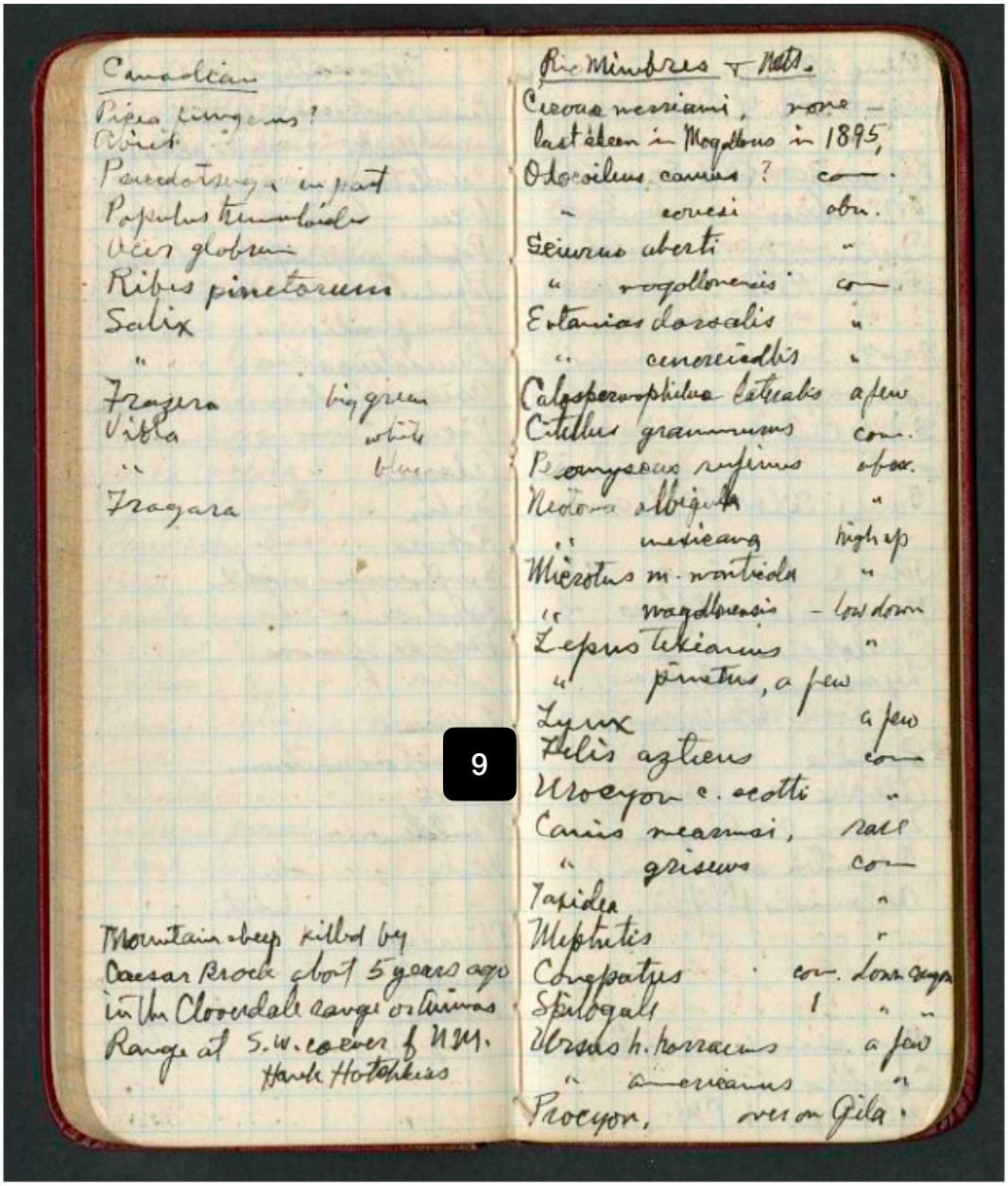
May 24 - up Powderhorn
Junco
Hylocichla
Kinglet
Zonotrichia
Meleagris
Syrnceem heard
May 25, back to Cooney Place
Wolf got away
May 26
Bubo - 1 seen

May 27
Lophophanes 1

Phrynosoma hernandisi - a few
3 small red ones on mesa
1 small black in canyon
Sceloporus small. com
(Ditto for: Sceloporus) large 1
Entanca 2



**8. On October 12, 2020, this is what the area looked like. This view is from the Black Range Crest Trail. Powderhorn Ridge is to the right, Cooney Place and other locations along North Star road are at the base of this system of ridges.**




9



9. ***Felis azticus*** **probably refers to what was known at that time as *Felis oregonensis aztecus* (Merriam). (See "*Mammals from the States of Sinaloa and Jalisco, Mexico, collected by J.H. Batty during 1904 and 1905* – Joel Asaph Allen, American Museum of Natural History"). *Felis oregonensis* is an invalid (junior synonym) for *Puma concolor couguar,* North American Cougar. Bailey indicates that it was common at that time. The photograph above is from a mural at Teotihuacán, north of Mexico City. This subspecies is found as far south as Central America.**

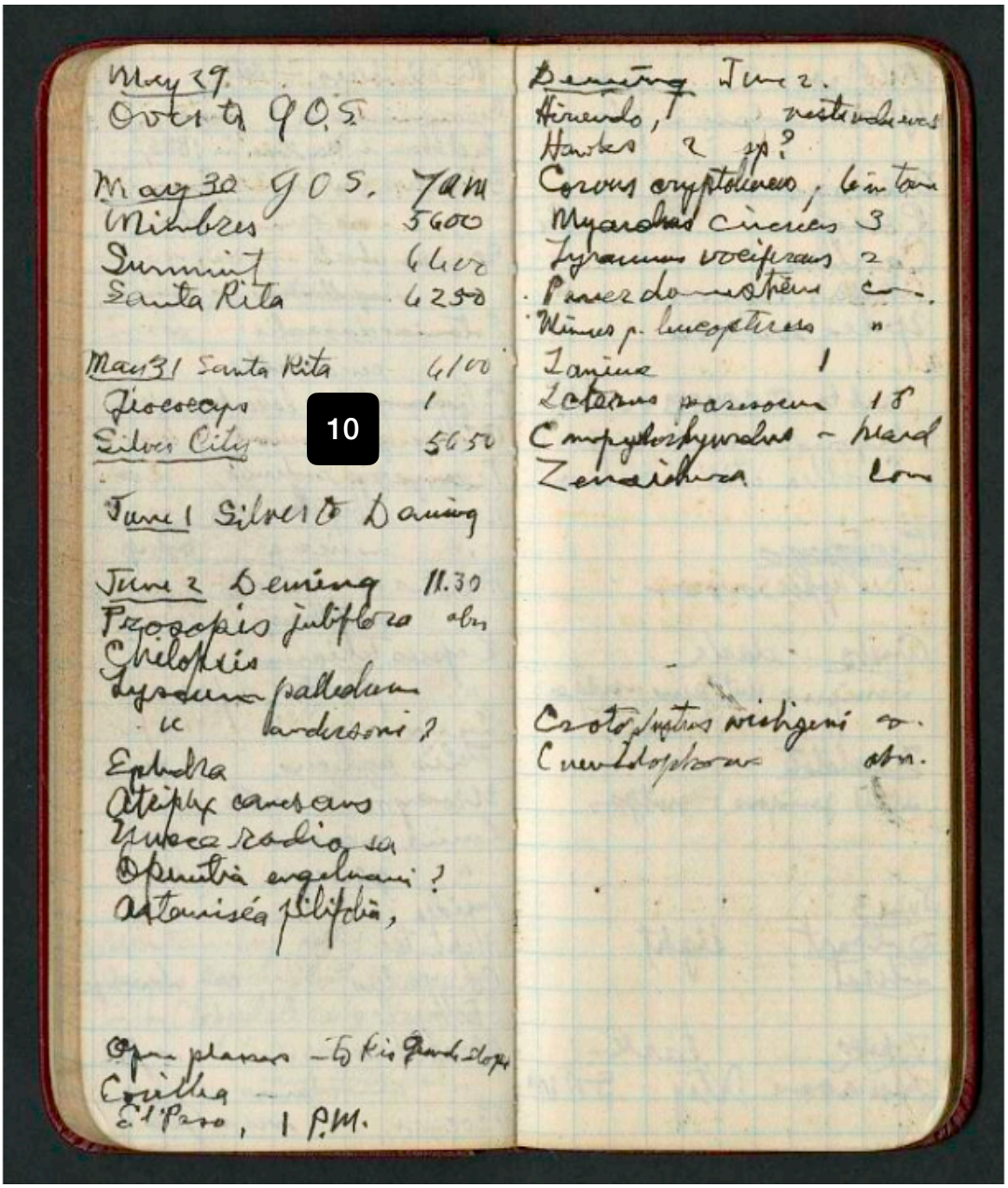
**LEFT PAGE**

**Canadian**
**Picea pungens?**
**Abies**
**Pseudotsunga in part**
**Populus tremanloides**
**Acer globrum**
**Ribes pinetorum**
**Salix**
**(Ditto for: Salix)**
**Frazera big green**
**Viola white**
**(Ditto for: Viola) blue**
**Fragara**

**Mountain sheep killed by Caesar Brock about 5 years ago in the Cloverdale range or Animas Range at S. W. corner of N.M. Hank Hotchkiss**

**RIGHT PAGE**

**Rio Mimbres & Mts.**
**Ceroas merriami, none - last seen in Mogollons in 1895,**
**Odocoileus camus ? com.**
**(Ditto for: Odocoileus) covesi abn.**
**Sciurus aberti (Ditto for: abn)**
**(Ditto for: Sciurus) nogollanensis com**
**Entanias dorsalis (Ditto for: com)**
**(Ditto for: Entanias) cenereiadbis (Ditto for: com)**
**Calospermophilus lateralis a few**
**Citellus grammurus com.**
**Peromyscus rufinus a few**
**Neotoma albigula (Ditto: a few)**
**(Ditto for: Neotoma) Mexicana high up**
**Microtus m. montinola (Ditto for: high up)**
**(Ditto for: Microtus) magellinensis low down**
**Lepus texianus (Ditto: low down)**
**(Ditto for: Lepus) pinetus, a few**
**Lynx a few**
**Felis azticus com**
**Urocyon c. scotti ([Ditto for: com]**
**Canis mearmusi, rare**
**(Ditto for: Canis]] griseus com**
**Taxidea (Ditto for: com)**
**Meptutis (Ditto for: com)**
**Conepatus com. down canyon**
**Spilogale 1 (Ditto for: down canyon)**
**Ursus h. horracus a few**
**(Ditto for: Ursus) americanus (Ditto for: a few**
**Procyon, over on Gila.**




**LEFT PAGE**

May 29
Over to G.O.S.

May 30 GOS. 7 AM
Mimbres 5600
Summit 6600
Santa Rita 6250

May 31 Santa Rita 6100
Geococcys 1
Silver City 5650

June 1 Silver to Deming

June 2 Deming 11.30
Prosopis juliflora abn.
Chilopsis
Lyscium pallidum
(Ditto for: Lyscium) andersoni?
Ephedra
Atriplex canescens
Yucca radiosa
Opuntia engelmani?
artemisia filifolia.

Open plains - to Rio Grande Slope
Eorillia -
El Paso, 1 P.M.

**RIGHT PAGE**

Deming June 2.
Hirundo, nests under eves
Hawks 2 sp?
Corvus cryptoleucus; 6 in town
Myiarchus cinercens 3
Tyrannus vociferous 2
Passer domesticus com
Mimes p. leucoptera (Ditto: com)
Tanius 1
Icterus paresorum 1 (male symbol)
Campylorhynchus - heard
Zenaidura com

Crotaphytus wislizeni com.
Cereveolophorus abn.



10. Greater Roadrunner, *Geococcyx californianus,* (photo to left).

## F. C. Pratt

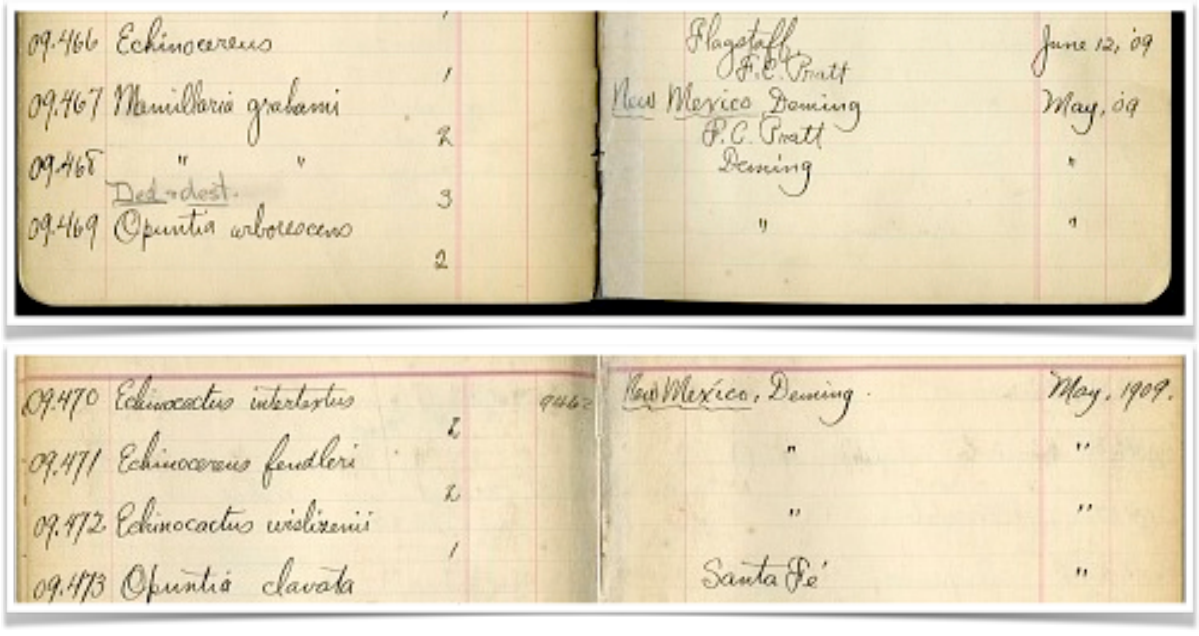
**Among Pratt's publications was *The Principal Cactus Insects of the United States*, 1912, USDA, Bureau of Entomology, with W. D. Hunter and J. D. Mitchell. (See cover right.) This publication was issued after Pratt's death. Pratt was primarily an entomologist, but he did collect cactus specimens as part of his work.**

**From a review of his work, it appears that much of his research in the west was conducted along the major railroad lines.**

**The notes of J. N. Rose indicate that at some point he was reviewing specimens collected by Pratt in Deming, during May 1909. (Excerpts from Rose's notebook shown below.)**

**His collections are noted in a variety of works; for instance, it is noted that he collected a variety of mosquito species in *Notes on the Mosquitoes of the United States*, 1900, L. O. Howard, USDA, Div. of Entomology.**



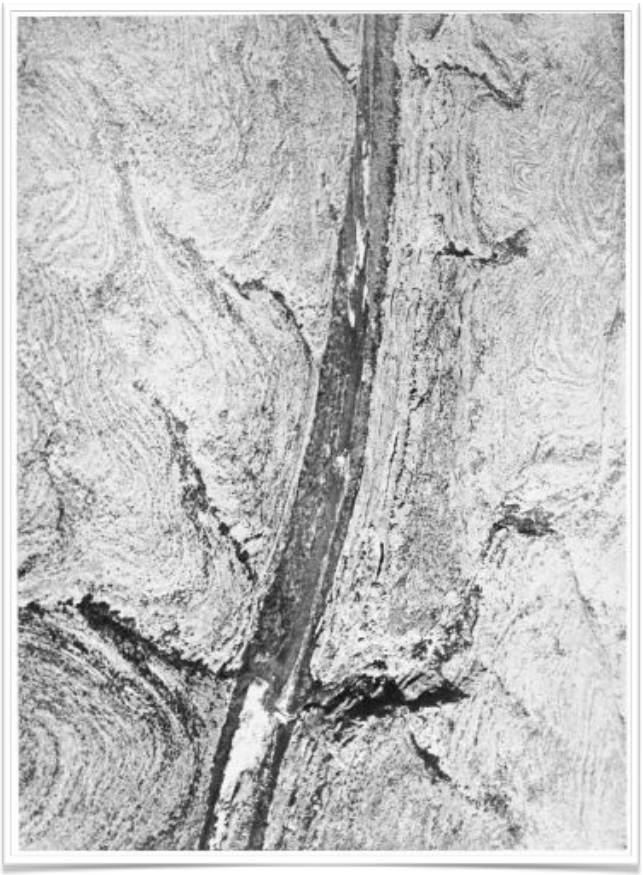



## Willis Thomas Lee

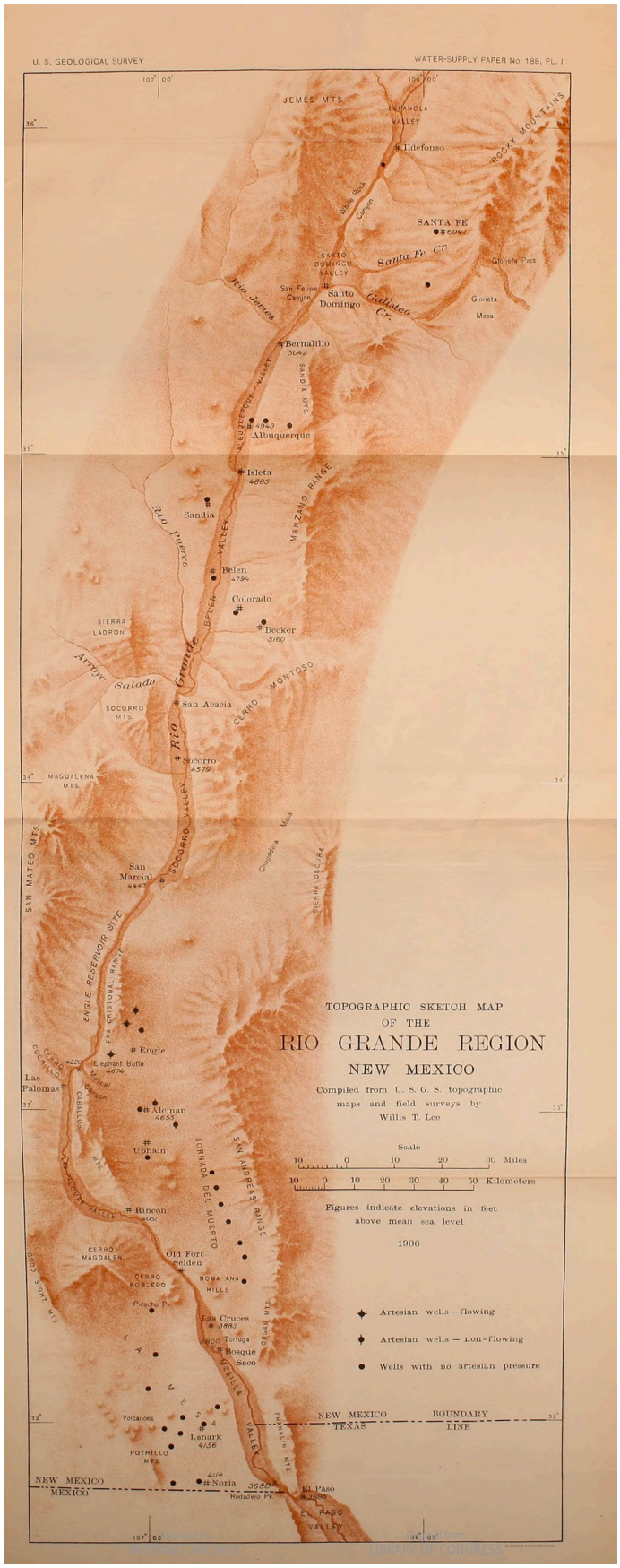
**Lee may be best known for his work on identifying the coal fields of New Mexico.**

**Some of his other works are far more important to us in the Black Range. In 1904 and 1905 Lee was studying the water resources of the Rio Grande Valley. He published his findings in *Water Resources of the Rio Grande Valley in New Mexico and Their Development, Water-Supply and Irrigation Paper No. 188* of the U.S. Geological Survey, 1907. The map to the right and the detail on the following page are from that work.**

**In 1906/1907, Lee reported on "a partial skeleton of Triceratops, a Late Cretaceous horned dinosaur, from what later became known as the McRae Formation near Elephant Butte. Little was collected before Elephant Butte reservoir covered the area, but the ceratopsian Lee discovered was later determined to be indeterminate or perhaps another genus such as Torosaurus, and the McRae now is known to contain a dinosaur fauna of modest diversity and of very late Cretaceous age." (*Celebrating New Mexico's Centennial - The Geology of New Mexico as Understood in 1912: An Essay for the Centennial of New Mexico Statehood, Part 2*, Barry S. Kues, University of New Mexico, p. 41.)**



**From "The Face of the Earth..." (See next page.) "Fig. 53 – Canyon in sedimentary rocks near the mouth of the Pecos River, Texas. The rocks consist of flat-lying strata, and the tortuous lines resembling the grain in wood denote the outcrops of hard layers and the benches formed on these layers by erosion. This photograph illustrates the use of air photography in geological reconnaissance." p. 71**



TOPOGRAPHIC SKETCH MAP
OF THE
# RIO GRANDE REGION
## NEW MEXICO

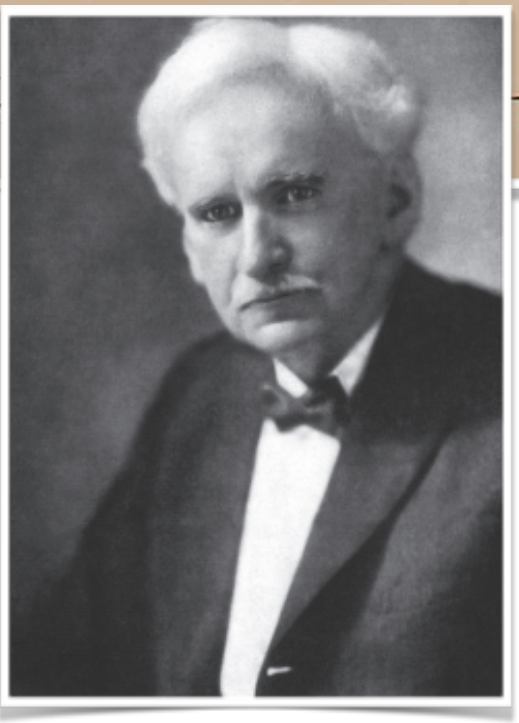
Compiled from U. S. G. S. topographic maps and field surveys by Willis T. Lee

Scale
10 0 10 20 30 Miles
10 0 10 20 30 40 50 Kilometers

Figures indicate elevations in feet above mean sea level

1906

Artesian wells — flowing
Artesian wells — non-flowing
Wells with no artesian pressure



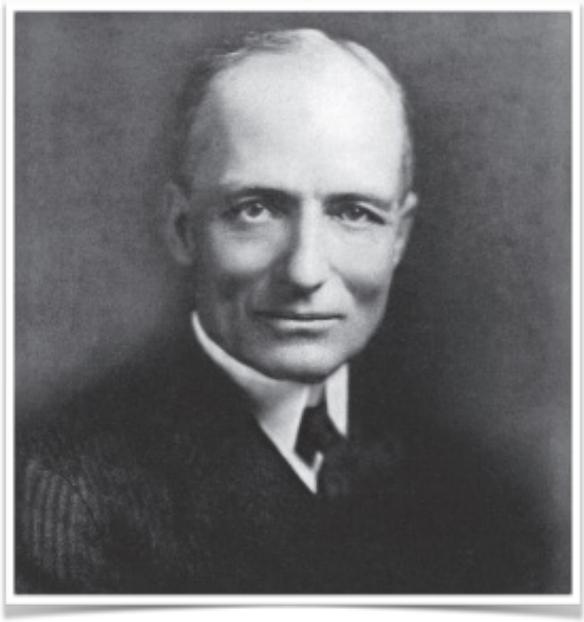
**Lee was a pioneer in many ways. In 1922 he published *The Face of the Earth as Seen From The Air - A Study in the Application of Airplane Photography to Geography* (American Geographical Society Special Publication No. 4, 1922). He was no longer working in New Mexico at the time, but this was a landmark in the application of a new technology to geology and geography. That is not to say that his work was groundbreaking. Work of this type often advances on many fronts, by many people. We view images like that on the preceding page without a second thought. Not so in the first decades of the 1900's.**

**Willis T. Lee (by Alden 1926)**

## George H. Girty

**Girty was a USGS Paleontologist who worked primarily in the southeastern part of the state. He worked with W. T. Lee during much of his time in New Mexico.**

**In 1907, Gordon (see below) stated in a footnote that a "bulletin of the U.S. Geological Survey treating of the fauna of the Lake Valley formations [sic] is now in preparation by Dr. [George H.] Girty…Girty apparently never completed or published his work on the Lake Valley fauna, which is unfortunate, as most elements of the profuse Lake Valley fauna, even its famous crinoids, have not been comprehensively studied to this day. The stratigraphy of the Lake Valley sequence as recognized in the early 20th century has been considerably refined since the 1940s with the addition of an underlying formation (Caballero) and several members of the Lake Valley Formation." (*Celebrating New Mexico's Centennial - The Geology of New Mexico as Understood in 1912: An Essay for the Centennial of New Mexico Statehood, Part 2*, Barry S. Kues, University of New Mexico. p. 31.)**



**George H. Girty (1940)**

## Charles Henry Gordon

**Gordon did an extensive amount of work in the area of the Black Range in the first part of the 1900's. He is the author of the section on Sierra County (pp. 213-285) in *Ore Deposits of New Mexico* (1910), the co-author (with Waldemar Lindgren, see below) of the section on Luna County (pp. 285-295), and the co-author (with Lindgren and J. M. Hill) of the section on Grant County (pp. 295-348). All of these chapters have extensive information about the geology of the area, as well as the more specific ores and mining activities.**

**In 1906 and 1907 Gordon was studying the geology of southern New Mexico. In the April 13, 1906, issue of *Science* (pp. 590-591) he wrote "Lower Paleozoic Formations in New Mexico". "The older Paleozoic strata have generally been considered absent in New Mexico. During the past summer, while engaged in field work for the U. S. Geological Survey, under the direction of Mr. Waldemar Lindgren, the undersigned found Cambrian, Ordovician, Silurian and Devonian formations at various places along a belt which crosses Grant, Sierra and Luna counties, and extends from the east side of the Rio Grande westward beyond the Arizona line and probably connects with the similar formations of the Clifton copper district in Arizona. The localities where these rocks are best exposed are the Caballos Mountains, the Hillsboro and Kingston mining districts on the east side of the Black Range, in the vicinity of Cooks (sic) Peak, and the Florida Mountains. In these places the Cambrian, Ordovician and Devonian are found. At Lake Valley and west of Silver City, near the mines of Chloride Flat, in addition to the foregoing formations, true Silurian limestone separates the Devonian and Ordovician strata. A more extended account of these formations will appear in a forthcoming number of the *American Journal of Science*." (Published with L. C. Graton)**

**In July 1907, Gordon published "Mississippian (Lower Carboniferous) Formations in the Rio Grande Valley, New Mexico" in *The American Journal of Science*, pp. 58-64.**

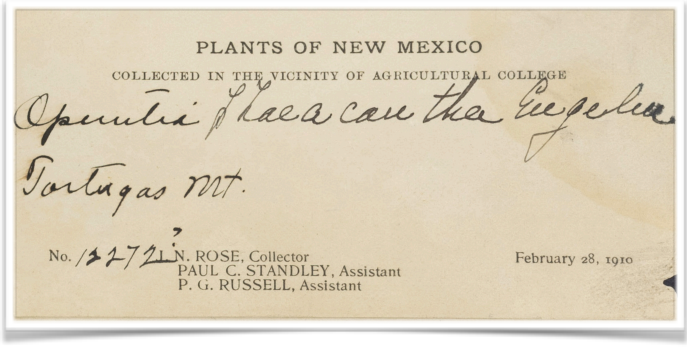
**Not much of his chapter in *U.S. Geological Survey Professional Paper 68, Geologic Structure of Parts of New Mexico* addresses our area. However, starting at p. 268 and extending to the end of the report there is an informed discussion of this region, including geologic cross sections.**

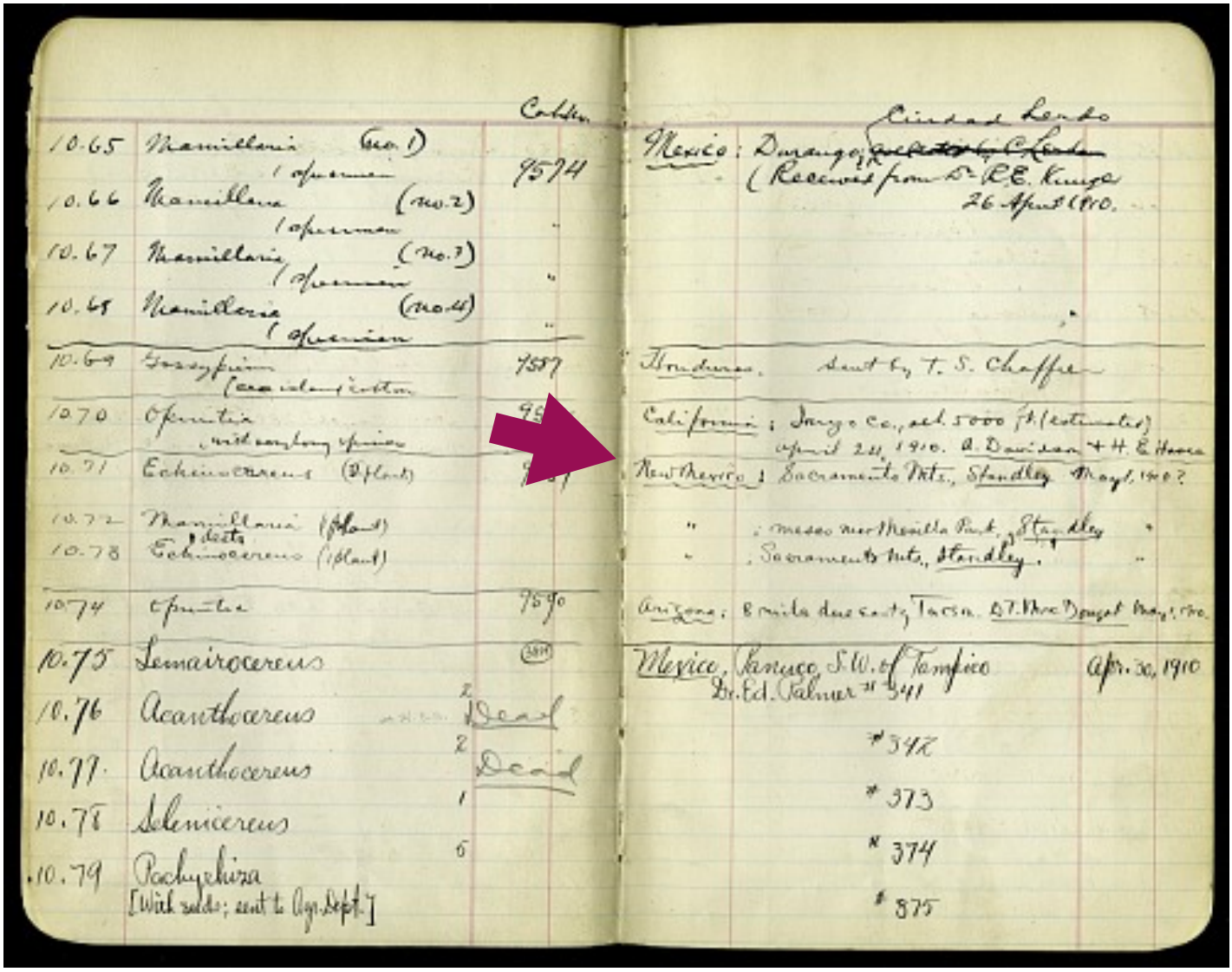
## Louis C. Graton

**Graton was one of the authors (along with Lindgren and Gordon) of *The Ore Deposits of New Mexico* (1910). He went on to become a professor in mining geology at Harvard and President of the Society of Economic Geologists in 1931.**

## Joseph Nelson Rose

**Rose is best known as one of the authors of the multi-volume monograph, *The Cactaceae*. Four genera of plants are named in his honor. His field work in Mexico and other locations was extensive.**





Apparently the closest he came to the Black Range were the mountains just to the east of Las Cruces in 1910 and Deming in May 1909. For example, he collected *the specimen of Opuntia phaeacantha* shown on the next page on February 28, 1910, in the Tortugas Mountains. (Note that Paul C. Standley is listed as "Assistant".) Rose, Standley, and Russell made an extensive collecting trip in 1910.

Rose's field notes from this general period (see above) seem to indicate a different date (or a later trip?) for his collecting activities in the area. He does note that he was with Standley on the collecting trip shown above. However, his notes from the collecting trip with Standley and Russell indicate the dates which correspond to the specimen sheets. (Included in the listing is a specimen of Opuntia collected by Wooton at the head of Horse Camp Draw, NM on 7/19/1904.)

**What Was Going On At This Time?**

**1891: Forest Reserve Law, designating forest preserves**
**1905: US Forest Service established**
**1924: Gila Wilderness Established**

**From the Bureau of Biological Survey**
**"The Survey" - January 1920**

"The constant trapping and hunting for wolves, lions, and big bears in the forests in New Mexico during the last three years have greatly reduced the number of these animals, as well as almost wiped out the bobcats in some districts. The result is that the present year has been most favorable for a good increase in –– and turkey, as well as other game birds. It is but natural to expect a big increase in the game supply of the state during the next few years, if seasons are favorable.

During the last week of April, 1919, antelope were found distributed through canyons and heavy timber of the Gila National forest, northeast of Silver City. In previous years these animals have sought protection in the same locality, commonly on the higher mesa country to the north to avoid the deep snow, but returning when conditions were favorable. This year they remained - probably because there were no –– to molest them and drive them back." (pg. 9)

THE NEW YORK BOTANICAL GARDEN copyright reserved



## Edward Alphonso Goldman

An employee of the Bureau of Biological Survey, Goldman was in New Mexico during 1908 and 1909 working extensively with Vernon Bailey. He eventually became the Senior Biologist in the Division of Biological Investigations. Immediately before his time in New Mexico he had been working in Mexico with Edward William Nelson. To quote the Smithsonian, "The biological explorations made by Edward William Nelson and Edward Alphonso Goldman in Mexico from 1892 to 1906 have been described as '. . . among the most important ever achieved by two workers for any single country.' They conducted investigations in every state in Mexico, collecting 17,400 mammals and 12,400 birds, as well as amassing an enormous fund of information on the natural history of the country." During his time in New Mexico he worked mostly in the borderlands, but in 1909 he reported that Pronghorn were "rather common on the plain 10 or 12 miles to the south of Lake Valley" and Mule Deer were "occurring west of Chloride and Kingston on the east slope of the Mimbres" (Black Range). That year he also reported that the Sonora Deer (Coues Whitetail, *Odocoileus virginianus couesi*) were present in the Mimbres Range west of Chloride and Kingston. (At that time this subspecies was considered a full species.)

His work was not limited to research on larger mammals, however. At Lake Valley, he noted that *Sylvilagus audubonii cedrophilus* (Desert Cottontail) was stripping the bark from *Acacia* and *Rhus,* apparently because of drought. He described many subspecies of mammal during his career. In this case, however, this subspecies of Cottontail was first described by Bailey in 1906. He noted that *Eutamias* (now *Neotamias*) *c. cinereicollis*, the Gray-collared Chipmunk, was eating Douglas Fir cones in the Mimbres Mountains.

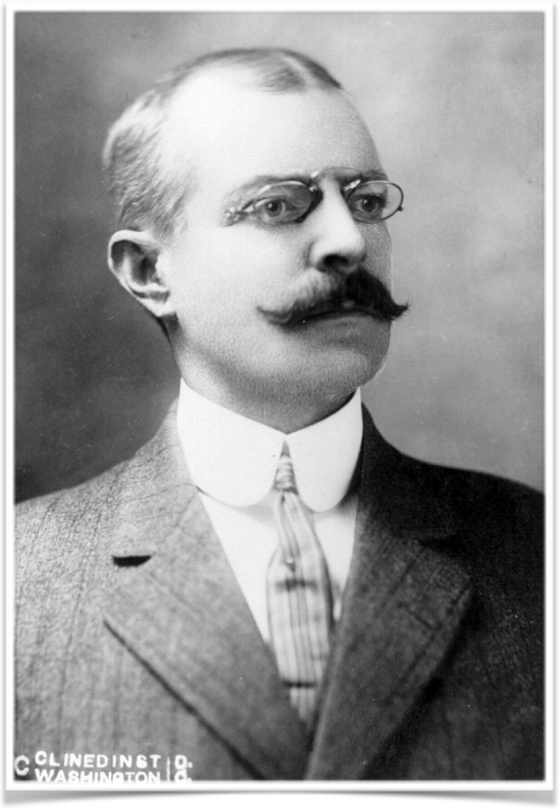
*Cynomys ludovicianus arizonensis*, the Arizona Black-tailed Prairie Dog, had substantial colonies in and around Lake Valley at this time, according to Goldman.

His collecting and observations during these two years were extensive. He was collecting in Hillsboro, Kingston, and the Black Range at the end of October and the beginning of November 1909. The notes of J. N. Rose indicate that he was reviewing (date unclear) two *Opuntia* species and an *Echinocereus*, collected by Goldman in Socorro on August 17-19, 1909, and other species Goldman collected in the San Mateos and San Augustin Plains in September and October 1909, in Hillsboro during November 1909, and Goldman specimens #1847-1849 collected at Las Cruces.

## Waldemar Lindgren

Lindgren was one of the principals in the development of the concepts of "economic geology". He published more than 200 major works and thousands of articles and abstracts. He was often a contributor to, or the editor of, major compilations published by the USGS. The honors and positions he received are myriad.

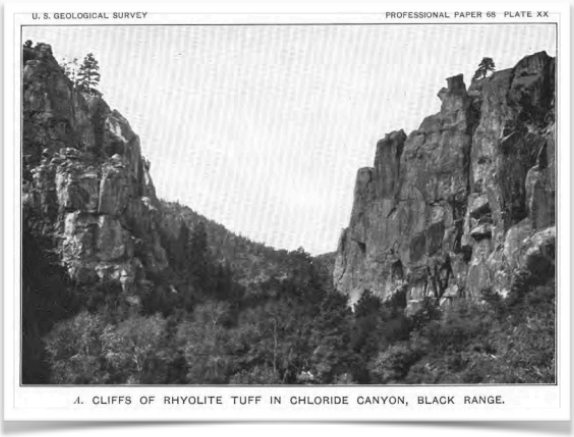
Lindgren was one of the authors of *Ore Deposits of New Mexico*, a work which ranged far from a simple discussion of ores. Its discussion of the known geology of the state was significant. Included in its descriptions was early work on the Rio Grande Valley: "The older portions of sand and gravel deposits as much as 2,000 feet thick within the valley of the central and southern Rio Grande and its tributaries, observed covering the base of




Waldemar Lindgren, 1912, photo by Clinedinst

some ranges to a height of 1,500 feet above the river, were called the 'Palomas gravels.' These were considered to be of early Pleistocene age, and possibly correlative with the Gila deposits to the west" (Lindgren, Gordon, and Garton, 1910, *Ore Deposits of New Mexico*, p. 237). "Recognition of these coarse sediment deposits, derived from erosion of the surrounding highlands, reflects very general observations of what was later to prove to be a much more complex, thicker, and longer pattern of sediment deposition in subsiding basins of the Basin and Range and Rio Grande rift regions over the past 25 to 30 million years." (*Celebrating New Mexico's Centennial - The Geology of New Mexico as Understood in 1912*: An Essay for the Centennial of New Mexico Statehood, Part 2, Barry S. Kues, University of New Mexico, p. 39.)

*Ore Deposits of New Mexico* (see photo on following page), includes a significant amount of information about the geology and mining activity of Sierra (pp. 213-285), Luna (pp. 285-295), and Grant counties (295-348). Lindgren was co-author of the Luna and Grant County sections of the book.




***Between pages 258 and 259 of "Ore Deposits of New Mexico"***

## N. H. Darton

**Darton was researching the geology of Luna County as early as 1910. In 1911, Darton and E. F. Burchard published "Fluorspar Near Deming, New Mexico" in *Contributions to economic geology (short papers and preliminary reports) 1910 : Part I -- metals and nonmetals except fuels*. They note (p. 533) that "in the summer of 1910 the general geology of the region was mapped by N. H. Darton in connection with the preparation of the Deming geologic folio and of a water-supply paper on the Mimbres Valley, and the fluorspar deposits were examined by E. F. Burchard." This paper not only includes a detailed discussion of the geology of Fluorite Ridge, northeast of Deming, it includes a description of early mining activity in the area.**

**In 1914, Darton published *Underground Water of Luna County New Mexico*, USGS.**

**By the time Darton published *A Comparison of Paleozoic Sections In Southern New Mexico* in 1917, ". . . he had correlated these units widely across southern New Mexico, from the Silver City area to the Sacramento Mountains. This paper is an excellent overview of the geology of this area. These formational names, with some subsequent refinements (several Devonian formations are now recognized in addition to the Percha), have been used ever since (Fig. 7)." (*Celebrating New Mexico's Centennial - The Geology of New Mexico as Understood in 1912: An Essay for the Centennial of New Mexico Statehood, Part 2*, Barry S. Kues, University of New Mexico, p. 31.)**

**Darton's correlation of strata from various areas in southwestern New Mexico (from *A Comparison...*, link above) is shown on the following page, as is an informative map from "*Fluorspar near Deming...*" (link above).**

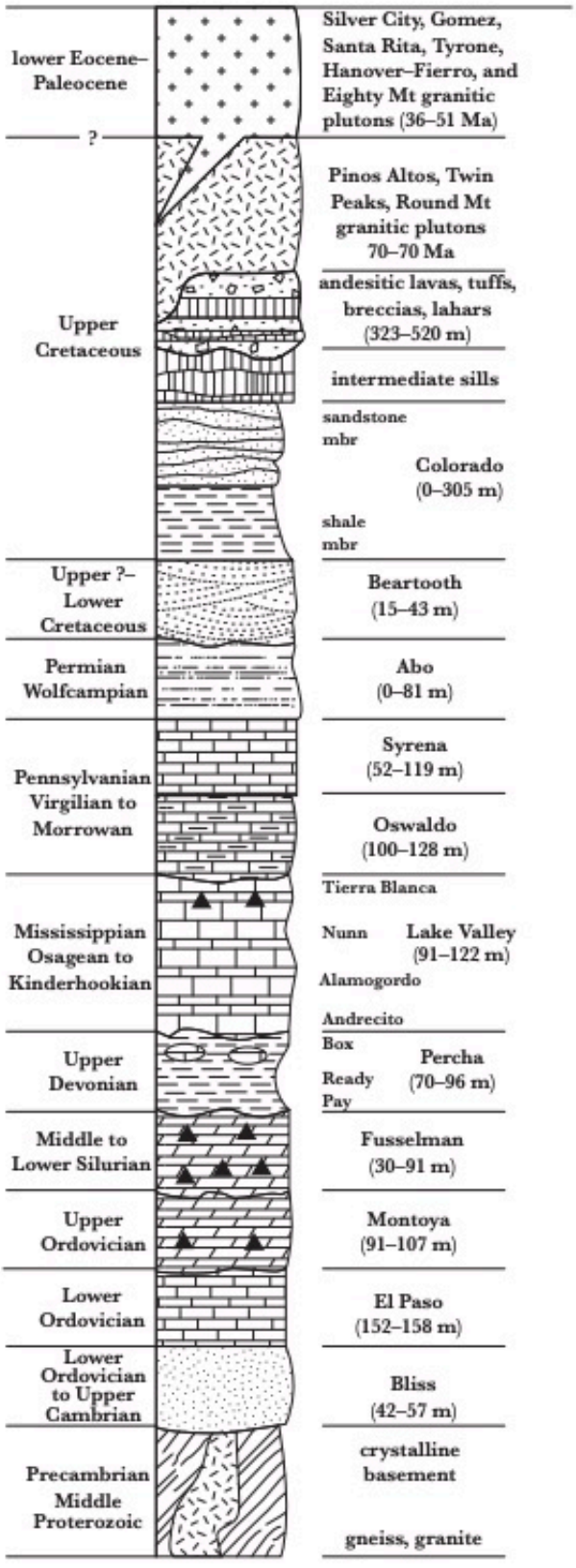



FIGURE 7—Modern stratigraphy of the Silver City area (modified from Mack et al. 2008). The Colorado Formation is a southern expression of the Mancos Shale, and the Beartooth is correlated with the Mojado or Sarten Formations by some stratigraphers.

## Darton's Map of 1910

**Continuing our presentation of maps as an insight into the study of natural history, we include the map to the right (Darton and E. F. Burchard; "Fluorspar Near Deming, New Mexico", which appeared in *Contributions to economic geology [short papers and preliminary reports) 1910 : Part I -- metals and nonmetals except fuels,* p. 534). Of interest at this time are the roads which are depicted on the map. Starting at the upper right, there is (as now) a road from the Florida watering station, on the AT & SF railroad line, to Fort Cummings. There is also a road to Fort Cummings from the east and one from the Fort north. There is also a road through "Massacre Pass" to the west of Fort Cummings which divides in Starvation Draw, to the right to Silver City and the Copper Mines, to the left to Deming. There is also a road from Deming north to the west side of Cooke's Range. These routes can still be followed, for the most part. They represent a link from the major transportation routes used first by the indigenous peoples, then the Spaniards, Mexicans, and Anglos, to the present. These routes are now replaced by a system of county, state, and federal highways which follow the same general paths. Sometimes we assume that routes of this time were associated with particular extraction areas (i.e., the roads to Fluorite Ridge were to service the fluorite mines) when in fact they were long existing routes which happened to have "modern" extraction sites along the way.**

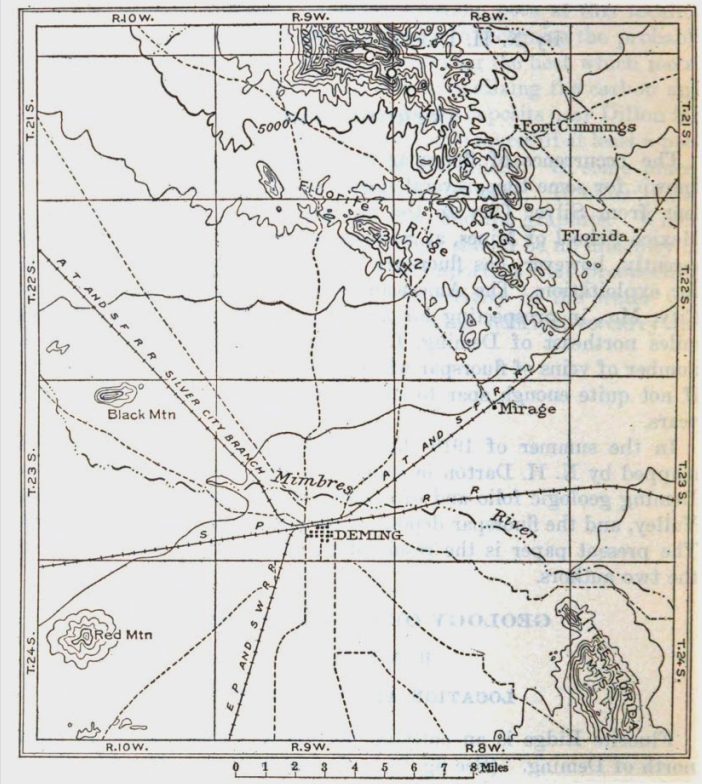



FIGURE 61.—Map of Fluorite Ridge and vicinity of Deming, N. Mex., showing location of fluorspar deposits. 1, 2, 3, Openings described in text.

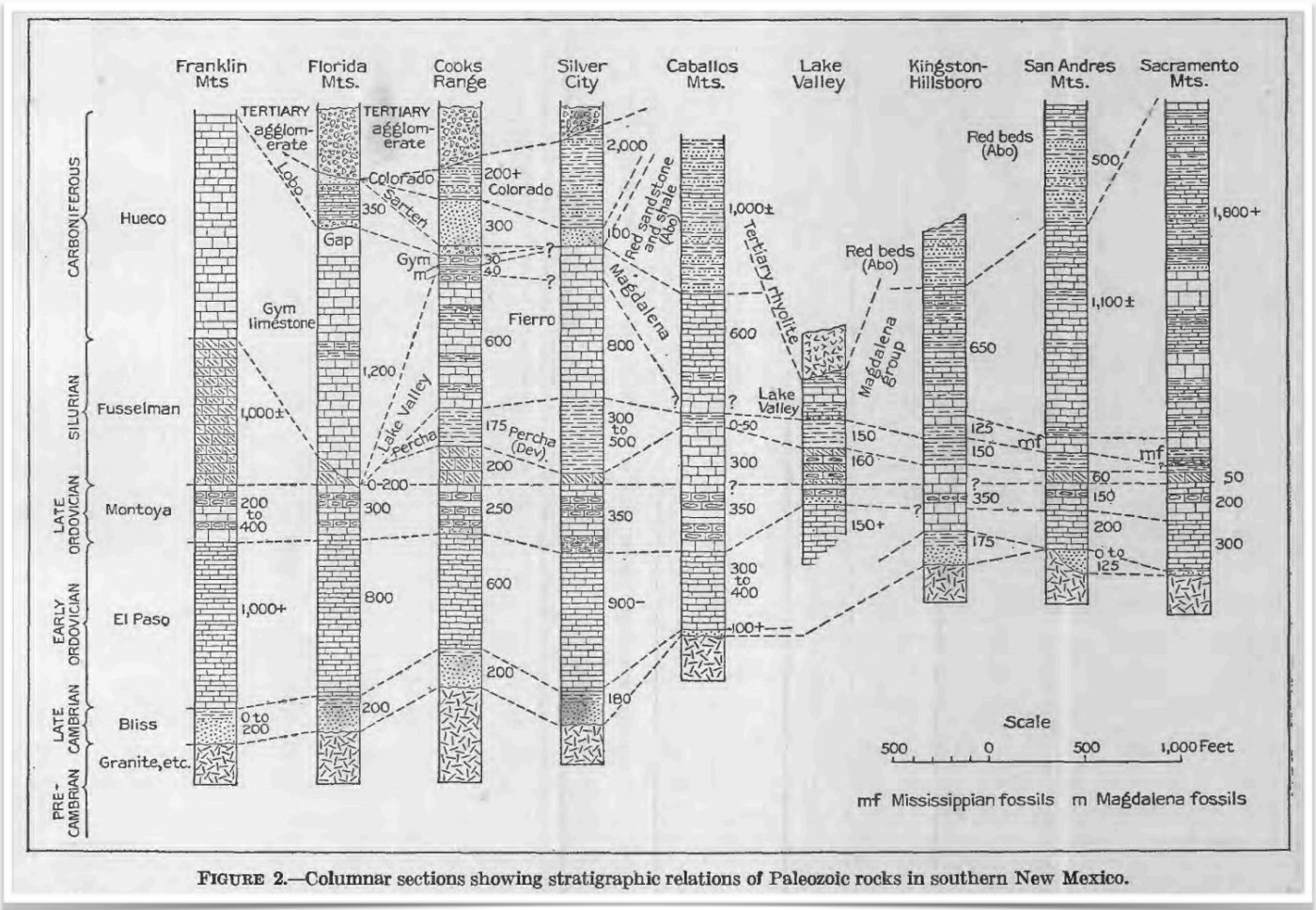



FIGURE 2.—Columnar sections showing stratigraphic relations of Paleozoic rocks in southern New Mexico.

***A Comparison of Paleozoic Sections In Southern New Mexico;* N. H. Darton; 1917, p.31**

**Barry S. Kues**
**On What It Was Like To Do Field Work In This Era**

"A typical USGS geologist would arrive in New Mexico in late spring or early summer by railroad, a journey of four or five days from Washington, D.C., the location of USGS headquarters. According to contemporary accounts (e.g., Morgan and Lucas 2002), meals along the way each cost from $0.60 to $1.25 and a hotel room $2.50 a night. Upon disembarking at a town closest to his field area, the geologist would need to purchase food and water sufficient for several days to a week or two in the field. Transportation, by horse or horse-drawn wagon or buggy (Fig. 3), would be rented or purchased. Wagons could be used for access to areas in which at least rudimentary roads existed, but travel by horse and pack train might be required for excursions to remote or topographically difficult regions. If the field work was lengthy, a local man with a wagon and saddle horse might be hired as cook and camp hand for $150 per month. Motorized vehicles were not used in survey field work until 1917 (Rabbitt 1989). Some geologists, like N. H. Darton, who were working in other areas of the West, would head south to the warmer climates of Arizona or New Mexico for a few weeks of field work in early fall before returning to Washington (King 1949).

Depending on the terrain and location, other measures were necessary. Dave Love (pers. comm., 2010) recounted additional practices from the field notes of Oscar Meinzer, who began watersupply studies of the Tularosa Valley in 1911, resulting in one of the classic works of New Mexico geology (Meinzer and Hare 1915).

> "Each notebook starts with Meinzer calibrating his buggy-wheel revolution counter with known mileages between Alamogordo and Tularosa. Then he records the number of revolutions at various places during his field work and calculates the number of miles he has gone in that feature-challenged landscape of the central Tularosa Basin. He also sights stars and lights of ranch houses at night to figure out where he is. 'The prudent geologist would inquire locally concerning roads and springs and other sources of water. He would have brought the relevant topographic maps for his field area, but in New Mexico topographic maps did not exist yet for most of the territory, and so reliance on local maps and information was important." (Celebrating New Mexico's Centennial: The geology of New Mexico as understood in 1912: an essay for the centennial of New Mexico statehood Part 1, Barry S. Kues, p. 9)

## Ned Dearborn

Ned Dearborn was a famed American ornithologist who worked extensively in New Mexico during 1910 and 1911. He was a member of the U. S. Biological Survey for more than a decade (1909-1920) and his focus extended widely, including a substantial amount of work on mammal species.

## Junius Henderson

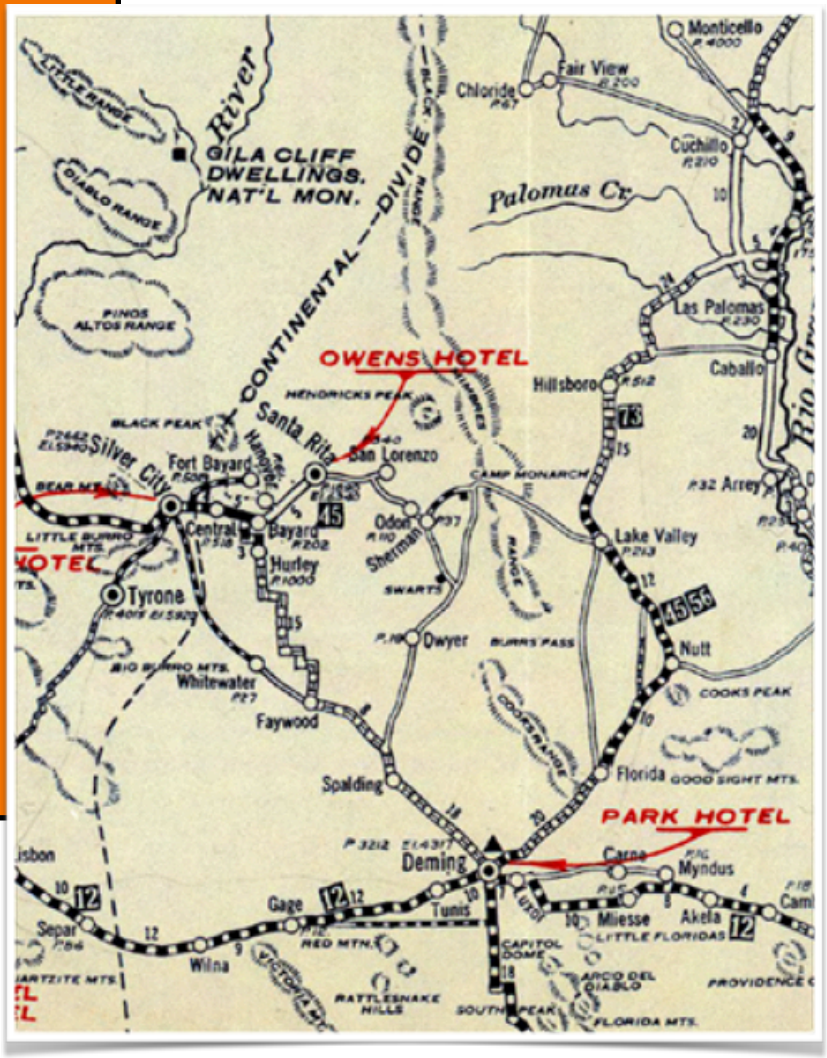
Henderson, who published many articles in *The Wilson Bulletin, The Condor, The Auk, Science, The Journal of Geology,* and, *the Proceedings of the Academy of Natural Sciences of Philadelphia*, among others, collected plants in the Black Range, 1910-13. His interests in natural history were wide-ranging. Much of his work was done in Colorado.

## Fannie Ford

In 1911, Fannie Ford published her *Preliminary List of Birds of New Mexico* (Report No. 1, Conservation and Natural Resources Commission of New Mexico, pp. 17, 63, 1911).

## Aldo Leopold

Steve Morgan has written a series of articles in the *Black Range Naturalist* about the career of Aldo Leopold, especially that part which occurred in Arizona and New Mexico. His series of




Rand McNally & Co.: Auto Trails Map Arizona New Mexico : 1925

articles began in the October 3, 2019, issue of that magazine (*Volume 2, Number 4*). Steven Siegfried also wrote an article about Leopold for the *Black Range Naturalist* (*Volume 2, Number 1 - January 2019*).

Leopold's concepts of alpha predators and their key roles changed the way natural history was studied. These concepts were the basis for later thinking in ecology, like that of keystone species.

## Ralph Todd Kellogg

Kellogg, who lived in Silver City for most of his life, was an ornithologist who worked with the Biological Survey in 1912. Although not from the Black Range, his report on the Arizona Cardinal in *The Condor*, November 1922, foretold its range expansion eastward from Arizona into the New Mexico and the Black Range:

> "Arizona Cardinal (*Cardinalis cardinalis superbus*). On May 8, 1922, at Red Rock, Grant County, New Mexico, these Cardinals were abundant, at least a dozen being seen, and a pair taken. The Gila River comes out of a tight "box" just northeast of Red Rock, and at that point their distribution up the river seems to end."

Kellogg worked along the Mimbres River from 1919 to 1922.

## Edwin Richard Kalmbach

Kalmbach was an American ecologist specializing in applied entomology and ornithology. In 1913 he was working for the Bureau of Biological Survey in New Mexico. Most of his work was done in the northern part of the state.

Jack Welch, in "In Memoriam: Edwin Richard Kalmbach" noted some of the "administrative" side of early field work at page 367. "Not all his work was done in Washington. Various studies required extensive field trips, mostly in the West. As he liked to recount later, these trips had their frustrations. Expense money was limited, and he frequently had to dip into his own funds to get by. Travel in those early days was largely by train, and this left the field investigator without transportation when he arrived at his destination. Dr. Kalmbach solved this problem by buying a motorcycle, but when the accounting office in Washington learned it had a sidecar, they immediately classed it as a passenger vehicle and disallowed the expenditure. Only with difficulty did he convince them it was to haul field equipment and supplies, not people." (*The Auk* 90: 364-374, April 1973)

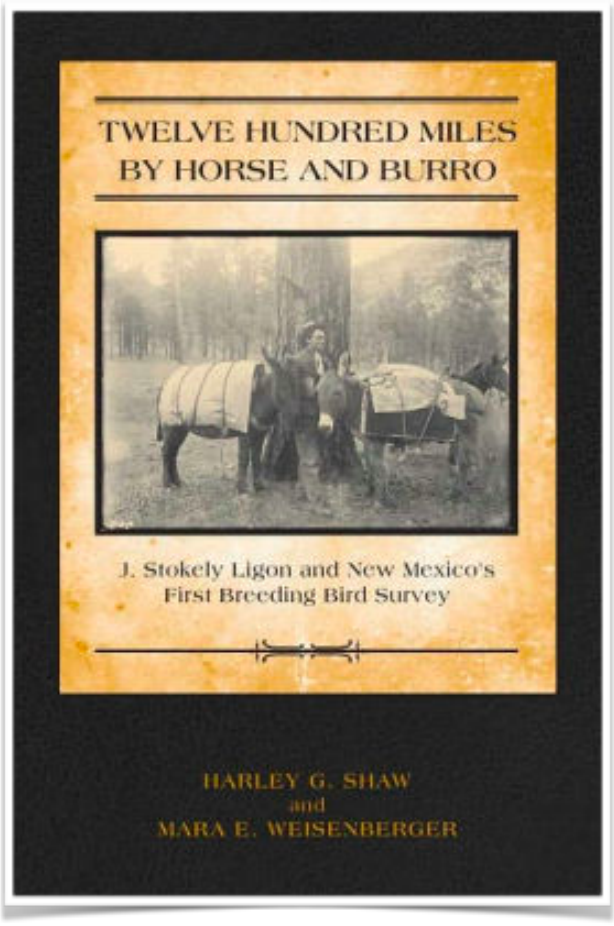
Among his many accomplishments, he promoted the enactment of the Federal Duck Stamp Act of 1934 and designed the 1941-1942 stamp, a Ruddy Duck (image above right).




## J. Stokely Ligon

Ligon was active in this area from the second decade of the century to the 1950's. He was doing deer surveys in Black Canyon during 1920, for instance. Among other significant accomplishments, he completed the first comprehensive bird survey of New Mexico. See Harley Shaw's, *Twelve Hundred Miles by Horse and Burro*, for an account of that effort. Among Ligon's works is *New Mexico Birds and Where to Find Them*.

In February 1920, Ligon was listed as a Predatory Animal Inspector for the Bureau of Biological Survey in New Mexico.



## William R. Chapline, Jr.



William Ridgely Chapline, Jr., was born on January 10, 1891, in Lincoln, Nebraska and died on December 19, 1986.

Chapline graduated from the University of Nebraska with a Bachelor of Science degree (forestry, botany, and agronomy) in 1913. While in school, he worked summers for the Forest Service, U.S.D.A., on the Nebraska and Coconino National Forests.

Following graduation, he almost immediately began field work, as noted in "Great Basin Station - Sixty Years of Progress in Range and Watershed Research" by Wendell M. Keck, USDA Forest Service Research Paper INT-118, 1972, p. 7:

> "As long ago as 1939, Lincoln Ellison remarked in a talk at the Utah State Agricultural College:
>
> 'Great Basin may be regarded as one of the two cradles of range research in this country. The other is Jornada Range Reserve in New Mexico. It is said that almost everybody in range research has, at one time or another, worked on the Jornada, and almost the same may be said of the Great Basin.'
>
> He named A. W. Sampson and F. S. Baker, who were then teaching at the University of California; W. R. Chapline, who had become Chief of Range Research for the Forest Service . . . At the beginning Director Sampson apparently was the only yearlong employee. In his annual report for 1913, he wrote:
>
> 'During the active field season there were three temporary assistants and one permanent assistant. The temporary men were Messrs. William R. Chapline, Jr., who now has a permanent appointment in the Forest Service as Grazing Assistant . . .'
>
> He comments that Mr. Chapline's services began on June 1 and ended on November 15."

At that time, temporary assistants for the summer field season were paid $75 a month plus $25 for expenses. (Ibid., p. 8)

Chapline's appointment as a Forest Service Grazing Assistant was at the Jornada Experimental Range in New Mexico, and by 1914-1916 he was collecting a significant number of plant specimens for the Forest Service. Of interest to us is that many of these specimens were collected on the east slope of the Black Range south of Hillsboro. (He, of course, was also collecting elsewhere.)

In 1920, The University of Nebraska Alumni Association noted that "William R. Chapline of the U. S. Forest Service has been promoted to inspector of grazing in charge of all grazing investigations." (p. 26)

Between 1920 and 1925 he was Chief of the Office of Grazing Studies, Branch of Grazing, and worked with the likes of Will C. Barnes and James T. Jardine.

The "List of Technical Workers in the Department of Agriculture - 1926", Miscellaneous Circular No. 73, March 1926, noted that Chapline held a Bachelor of Science degree and was the Inspector of Grazing, in charge at the Forest Products Laboratory, Grazing Research, in Madison, Wisconsin. In 1928, he held the same position ("Miscellaneous Publication No. 31", July 1928, p. 35). "Miscellaneous Publication No. 63", July 1929, p.42, listed Chapline as the Senior Inspector of Grazing, in charge, in the Range Research Branch of U.S.D.A..

In 1924, he joined with L. C. Gray, O. E. Baker, and F. J. Marschner to publish "The Utilization of Our Lands for Crops, Pasture, and Forests" in the *USDA Yearbook of 1923* (pp. 415-506). This was, at the time, an influential work and was cited regularly. He was the author and/or co-author of many significant works during his career.

Chapline retired as Chief of the Division of Range Research in 1952. Following his retirement from the Forest Service, he became Chief of the Forest Conservation Section of the Food and Agriculture Organization of the United Nations. He served there until 1954 and then taught graduate programs in his speciality in Uruguay and Brazil and consulted on projects in Europe and South America.

*Important Western Browse Plants*, Misc. Publication 101 of the United States Department of Agriculture, July, 1931, page 4, notes that there were approximately 1,100 National Forest Range Plant Collectors and that William Chapline, Jr., was one of 52 who had collected more than 200 annotated specimens kept at the Forest Service archives in Washington, D.C.

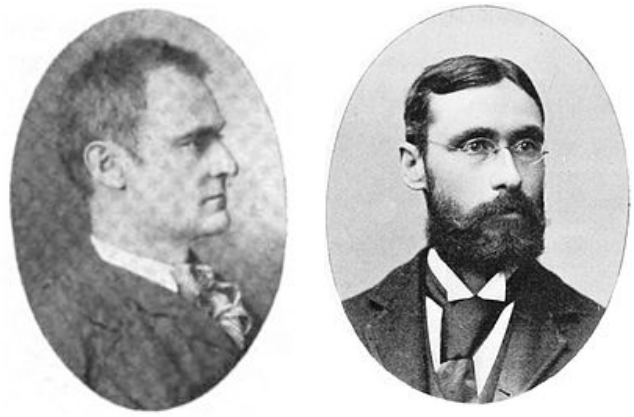
Of all his accomplishments, it is this last one which is of interest here. As he walked the hot hillsides of the Black Range during 1914 and 1916 he might have dreamed of a remarkable future, or he might simply have hoped for a bit of shade and water.

## Snails, Ferriss, and Pilsbry

In 1915, James Henry Ferriss and Henry Augustus Pilsbry were prowling around the Black Range. If they were rustlers or bank robbers, their story would be legend. But they were not, they were snail collectors. In particular, land snail collectors.

Of the two, Pilsbry was the most renowned, being described as a dominant presence in many fields of invertebrate taxonomy

for the better part of a century. In 1917, they published "Mollusca of the Southwestern States, VIII: The Black Range, New Mexico" in the *Proceedings of the Academy of Natural Sciences of Philadelphia* (pp. 83-107 with four additional plates). In the article, they described a collecting trip in the Black Range during the summer of 1915. Annotated excerpts follow (spelling and punctuation as in the original - "sic" is not used here).



*James Ferris (left) in 1904 and Henry Pilsbry in 1914*

"Approaching from the west, by way of the Mimbres Valley and up Gallina Canyon, we reached the crest above the head of Silver Creek. Subsequent camps were made at intervals from Sawyer Peak, the southern end of the range, to Reed's Ranch on Black Canyon, our route being along the crest trail, with numerous short trips down the slopes, and a two-day trip to Kingston . . . travel was by pack train." (p. 83)

Note the mention of a well-established crest trail with reference points we are very familiar with today: Sawyer Peak, Black Canyon, and Reed's Ranch. Maps are at pages 84 and 85 of the article and show Wright's Cabin, the McKnight Fire Cabin, and a road across the Black Range south of Sawyer Peak, among other features.

"Fine forest extends down nearly to the 7,000-foot contour. It has been well protected against fire and its remoteness has deterred the lumberman. The yellow pine, spruce and quaking asp are large and the ground well covered with forest mold." (p. 83)

See Volume 2, Number 1 (January 2019) of the *Black Range Naturalist* for an excellent discussion of the fire history of the Black Range by Larry Cosper.

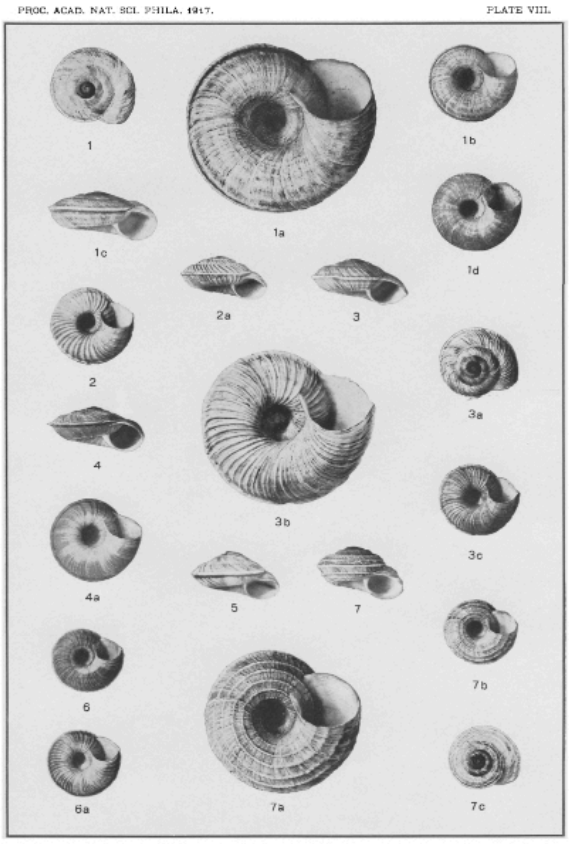
"A good crest trail is maintained by the Forestry Service, and several cabins along it are occupied by forest rangers during the dry season . . . Deer, bear and wild turkeys are abundant. There are no rattlesnakes in the forest zone, though occasionally seen up to about 6,000 feet." (p. 86)

Most of the article is, as would be anticipated, a scientific discussion of the snail species collected, scientific descriptions, listings of collecting sites etc. In addition to the discussion of the subject species, the article provides excellent insight into how natural history was done in the Black Range in 1915. Plate VIII from the article is shown below.

Ferris later wrote an account of the collecting trip entitled "A Shell Hunt in the Black Range". It was published in the January 1917 issue of *The Nautilus*, Henry Pilsbry editor and publisher. Before you jump to the conclusion that there was collusion, let me point out two things: 1) probably; and 2) Pilsbry was probably the leading authority on mollusks in North America at this time. It was that standing that made him the obvious choice of Editor for *The Nautilus - A Monthly Journal Devoted to the Interests of Conchologists*. And, the format of the publication included a mix of science and the adventure which is sometimes a part of science. For instance, the previous issue (December 1916) included articles like "The Anatomy of the Nayad Hyripsis Myersiana" and "Shell Collecting in the Sierra Nevadas".

Whereas "Mollusca of the..." was heavy on descriptions and scientific keys, "A Shell Hunt . . . . " was written in a different vein. For instance,

". . . the work continued for another month by way of Black Canyon, Diamond Creek (where we were detained briefly by enormous speckled trout) . . . It was our highest and wildest range to date. The cattle, wild and keen of scent, are trapped for slaughter in corrals with swinging gates, something like monster



turkey-traps. Black and silver-tipped bears, and mountain lions were plentiful. (p. 100) . . . Again when alone, and my thoughts were far away, just at dusk, a robust mountaineer from the Great Smokies came into camp to show me the mummied right hand of the last man who climbed the trail to take him back to Tennessee. As a stranger, and a little timid, it was my part to show that I had no particular interest in the specimen; but those mountaineers possess keen insight into the minds of the tender-feet and I presume the camp site is marked also. However, the dwellers of the high and lonesome will never find the spot where I lay out the rest of the night watching to see if that uncanny naturalist was coming back with any more fragments of his specimen . . . ." (p. 101).

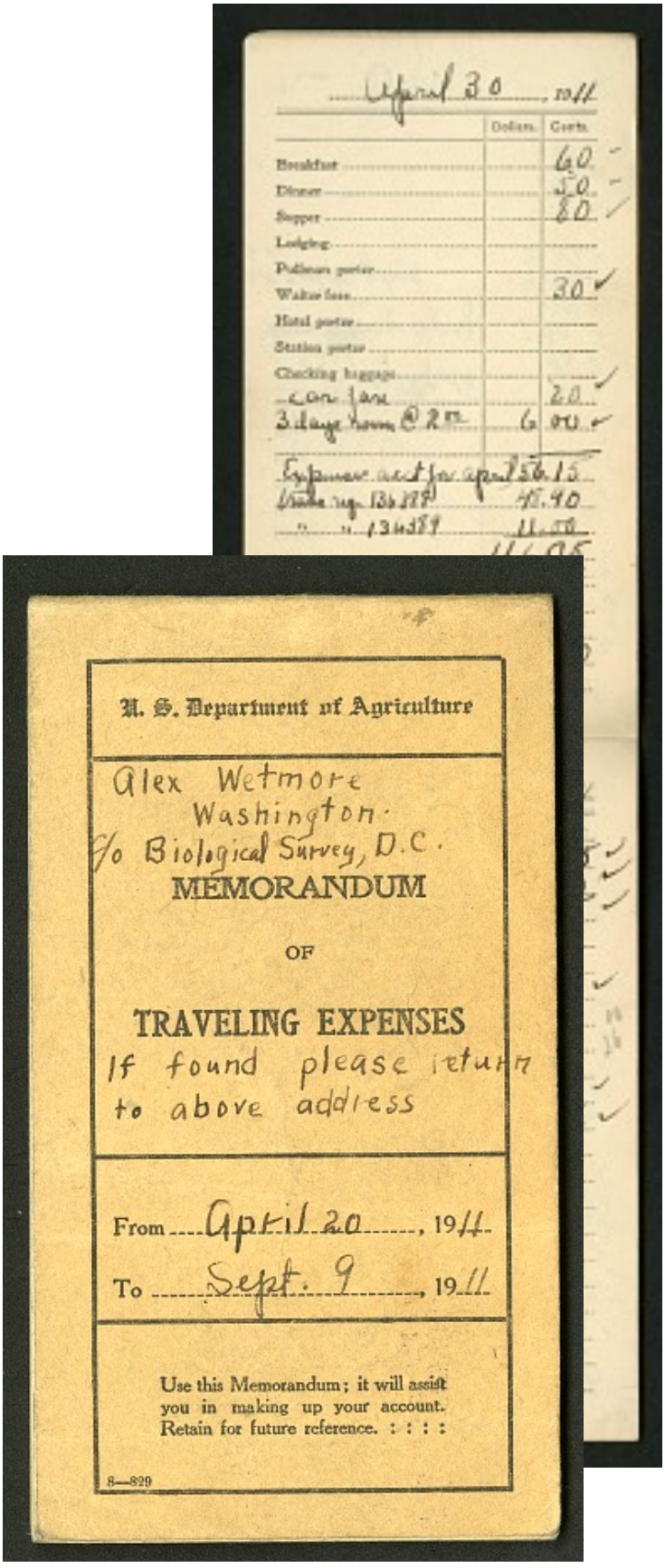
If, by chance, you are a snail person, you may also be interested in *Land Snails of New Mexico*, Bulletin 10 of the New Mexico Museum of Natural History and Science.

(Editors Note: I grew up bounding across the taiga bogs near Fairbanks, Alaska; waiting patiently in large tide pools in Puerto Rico; "surveying" Mourning Dove nests near Dexter, New Mexico; hiking the Anza-Borrego and Mojave Deserts; tromping through the woods of the eastern United States looking for wildflowers; and worrying about people wanting to take me back to Tennessee. When not living my own life I was absorbing those of Bates, Wallace, Darwin, Cook, and Humboldt. Such a wonderful mix of science and adventure. Now, as I creak about my home in southwest New Mexico, I discover that hard science and adventure occurred here in the Black Range in the early 1900's. Good stuff.)

## Frank Alexander Wetmore

Wetmore was an ornithologist and avian paleontologist who worked in New Mexico, for the Biological Survey, during 1918. Among other things, he was Secretary of the Smithsonian Institution from 1945-1952.

While working for the Bureau of Biological Survey, employees were often working independently or with a small team, generally without any support. They were assigned to study something, somewhere, and sent there to do it. This model was different from that of an expedition, like those that traveled the west in the 1800's. In those settings, participants were paid and everything else (which was often meager) was furnished. In the later model, employees worked in the field and kept an expense account. The images to the right (the cover and the entry for April 20, 1911) are from the expense record kept by Wetmore in 1911, in Alaska.




## Ray Painter

Painter collected plants in the Black Range, 1921. He completed his Forest Service Ranger Training in Flagstaff in about 1924 and was serving as a ranger in the Gila National Forest in 1925.

**USFS**

**Painter, McClure, Onstad, Smith, and Hyatt were all collecting for the United States Forest Service and have specimen sheets housed at the USFS National Herbarium (part of the Rocky Mountain Herbarium). This is characteristic of a time when the US Forest Service emerged, along with the universities and Biological Survey, as a major player in the study of natural history. Their very work brought them into daily contact with the natural world and required that they understand it to the best extent possible. What better place to study the natural world than the Hillsboro Peak lookout, shown here in two early photos, along with (the perhaps atypical) Fire Lookout, Miss Anderson (1923) - US Forest Service Photographs.**



## Jay R. McClure

**McClure collected plants in the Black Range, 1921. Twenty-one of his specimen sheets are at the Rocky Mountain Herbarium, which includes the U.S. Forest Service National Herbarium and the W.G. Solheim Mycological Herbarium and, collectively contains more than one million specimens.**

## W. L Onstad

**Collected plants in the Black Range, 1921.**

## H. Garvin Smith

**Smith, who collected plants in the Black Range in 1923, joined the US Forest Service in 1917.**

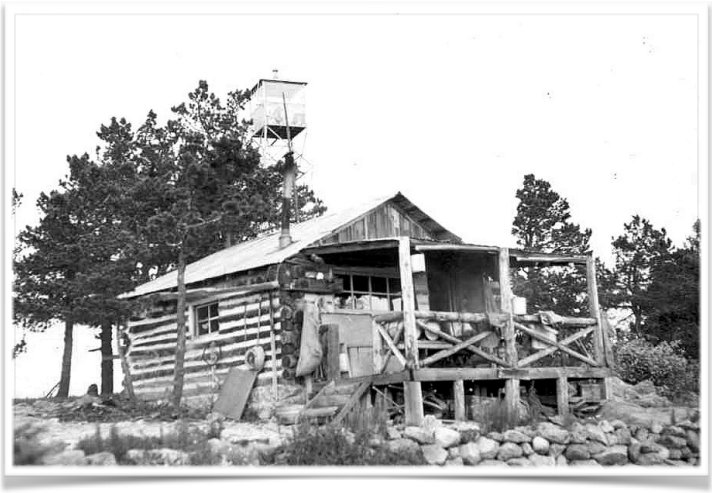
## Harry H. Hyatt

**Collected plants in the Black Range, 1926.**

## R. P. Boone

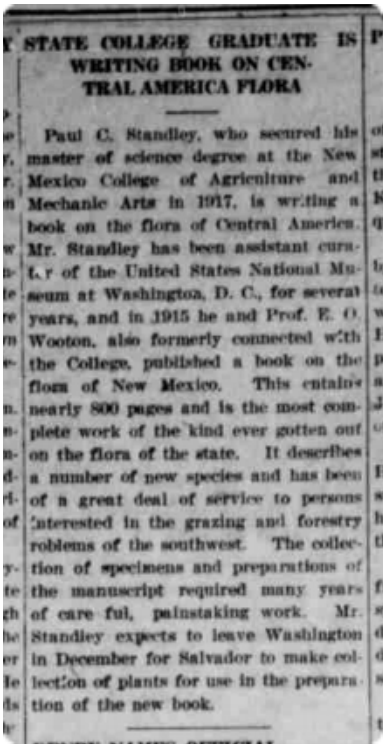
**Collected plants in the Black Range, 1929-1930. During 1937 he was assigned to the Gila National Forest.**





## Paul C. Standley

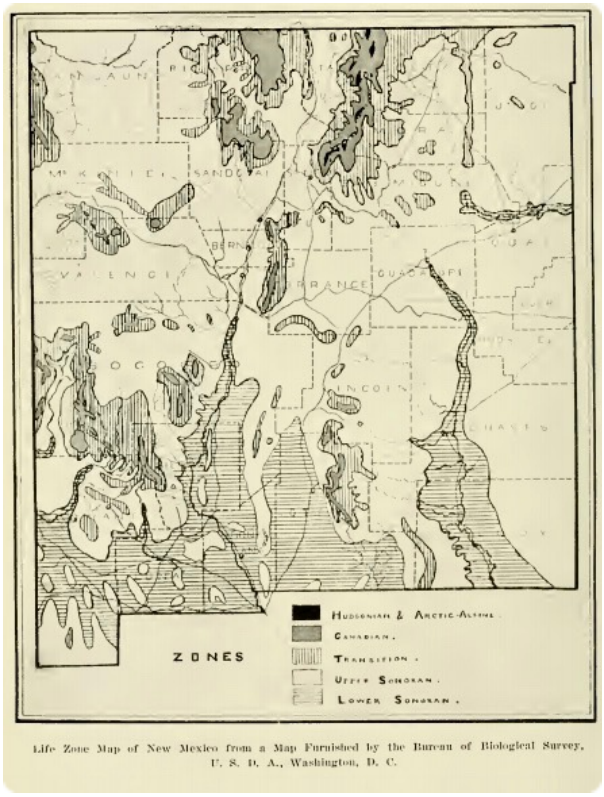
**The history of naturalists in the Black Range is extensive but often forgotten. Paul C. Standley received his bachelor's degree from New Mexico State College in 1907 and his master's the following year. After graduating, he spent two years there before moving on to the United States National Museum (1909-1922), where he was the Assistant Curator of the Division of Plants. He worked at the Field Museum of Natural History (Chicago) from 1928 to 1950. In 1950 he retired from the Field and taught at the Zamorano Pan-American Agricultural School in Honduras until 1956. He died in Honduras on June 2, 1963.**



STATE COLLEGE GRADUATE IS WRITING BOOK ON CENTRAL AMERICA FLORA

Paul C. Standley, who secured his master of science degree at the New Mexico College of Agriculture and Mechanic Arts in 1917, is writing a book on the flora of Central America. Mr. Standley has been assistant curator of the United States National Museum at Washington, D. C., for several years, and in 1915 he and Prof. E. O. Wooton, also formerly connected with the College, published a book on the flora of New Mexico. This contains nearly 800 pages and is the most complete work of the kind ever gotten out on the flora of the state. It describes a number of new species and has been of a great deal of service to persons interested in the grazing and forestry problems of the southwest. The collection of specimens and preparations of the manuscript required many years of care ful, painstaking work. Mr. Standley expects to leave Washington in December for Salvador to make collection of plants for use in the preparation of the new book.

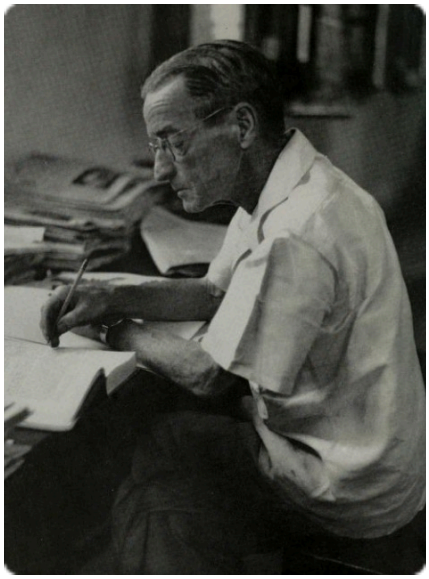
**What was he doing between 1922 and 1928? The answer lies in this article from *The Deming Graphic* issue of October 24, 1921. At that time the first volume of the seminal *Trees and Shrubs of Mexico* had just been issued. He worked on the other volumes until the last was published in 1926.**




Life Zone Map of New Mexico from a Map Furnished by the Bureau of Biological Survey, U. S. D. A., Washington, D. C.

**In 1915, he and E. O. Wooton published *Flora of New Mexico*, the standard botanical work for our area for decades. That work was one of many he was to research/write in a long and illustrious botanical career. He was characterized by many prominent peers as one of the premier botanists of his era.**

**In December 1911, Wooton and Standley completed *The Grasses and Grass-Like Plants of New Mexico* (published the following year). The life zone map (page 8) and description of the "lower Sonoran" life zone (page 11) from the *Grasses* book are shown here. These two books, *Flora* and *Grasses*, are foundational works for the study of botany in New Mexico. Unfortunately, it is not the people who contribute who are remembered, it is the scoundrels.**





Photograph by H. H. Bartlett

STANDLEY ABOUT 1910
At the United States National Herbarium

1. **Lower Sonoran Zone.** This covers the lower plains and mesas and the larger river valleys of the southern third of the State. Characteristic woody plants are the Creosote Bush (*Covillea glutinosa*) (often mistakenly called Greasewood), the Spanish Bayonet or Dagger (*Yucca macrocarpa*), *Zizyphus lycioides*, *Condalia spathulata*, Tornillo or Screw Bean (*Strombocarpa pubescens*), *Acacia constricta*, *Acacia greggii*, Desert Willow (*Chilopsis linearis*) and Valley Cottonwood (*Populus wislizeni*). On the mesas Black Grama (*Boutcloua eriopoda*), Tobosa Grass (*Hilaria mutica*), False Needlegrass (*Scleropogon brevifolius*), Mesquite Grass (*Muhlenbergia porteri*) and several of the true needle grasses (*Aristida* spp.) are characteristic, while in the valleys Salt-grass (*Distichlis spicata*) and Bunch grass (*Sporobolus airoides*) are common, especially in alkaline soils. A number of species of Cacti are also common. This zone is dry all the time and hot in the summer time. The average precipitation is 8 or 9 inches and the maximum summer temperature is from 100° to 106° F.

Standley was a respected and influential botanist who explored the Black Range and made major contributions to our understanding of the botany of New Mexico.

## Lyndon L. Hargrave

The famed archaeologist worked throughout the American Southwest, including along the margins of the Black Range. His work in the Southwest started in 1926. Among his many accomplishments was the development of a comparative collection of more than 300,000 bird bones to be used to determine the identity of bird bones found at archaeological digs. His efforts in that vein were important in his studies of the Wild Turkey in relation to early Southwest cultures. He published numerous articles about his bird studies (in *Condor, Auk*, etc.). His *Mexican Macaws, Comparative Osteology and Survey of Remains from the Southwest* was a truly significant work.

## G. W. Evans

Not a naturalist, per se, but of interest to us is G. W. Evans, who reported that he killed a:

> *". . . large grizzley bear in April, 1930, on the east slope of the Black Range just north of Hillsboro Peak after following the trail about 10 miles from the extreme headwaters of the Mimbres on the south slope of Reeds Peak. According to local residents this bear had been killing livestock in the vicinity for the past many years. The skull shows that it was a very old bear with much worn teeth, possibly 15 or 20 years old. At the time this bear was killed tracks were found of a smaller grizzly that had been traveling with it, but the smaller one had not been reported as killing stock, so it could not then be legally killed.*
>
> *It seems probable that many grizzlies killed in the Mimbres and Mogollon Mountains of New Mexico within recent years are also of this species (Ed. - Taxonomy determinations, at this time, were different than at present.) It is very desirable that more skulls and skins should be obtained from this region to satisfactorily clear up the distribution of the forms of bears found there."* From *Mammals of New Mexico; Vernon Bailey, 1931, pp. 359-360.*

## In Summary

This survey of the naturalists who have added to our knowledge of the Black Range is far from comprehensive. Instead, it is meant to reflect how the continuous study of this region has evolved. There are many ways to describe how the study of natural history in the Black Range has changed since the 1500's, but it seems that two are especially useful: who the sponsors of studies were, and the shift from generalists to specialists.

The "sponsors" of studies in the Black Range have shifted over the years. The indigenous people sought to understand and exploit the natural world so that they might survive. This study, for them, was cultural and deeply engrained.

In this area, the views of those who entered during the Spanish and Mexican periods were not dissimilar to the perspective of the indigenous peoples, except as a matter of focus. The Europeans (Spanish, Mexican, and Northern European) who first entered the area were here to exploit its resources, to stay alive, surely, but certainly to get rich.

The first structured studies were organized and funded by the U. S. Federal Government. These expeditions were typically led by military officers and were primarily expansionist in nature. The study of natural history was frequently added on to the government survey work of this period. Although much of the natural history work done at this time was "pure science", there was a strong motivation to learn what "was there to be exploited".

By the end of the 1800's, academic institutions (universities and museums) became major sponsors of the studies in this region. The federal government continued its studies via institutions like the United States Geological Survey and the Biological Survey. Both of these institutions were driven by economic considerations. The federal land agencies became more involved in studies as the 1900's began.

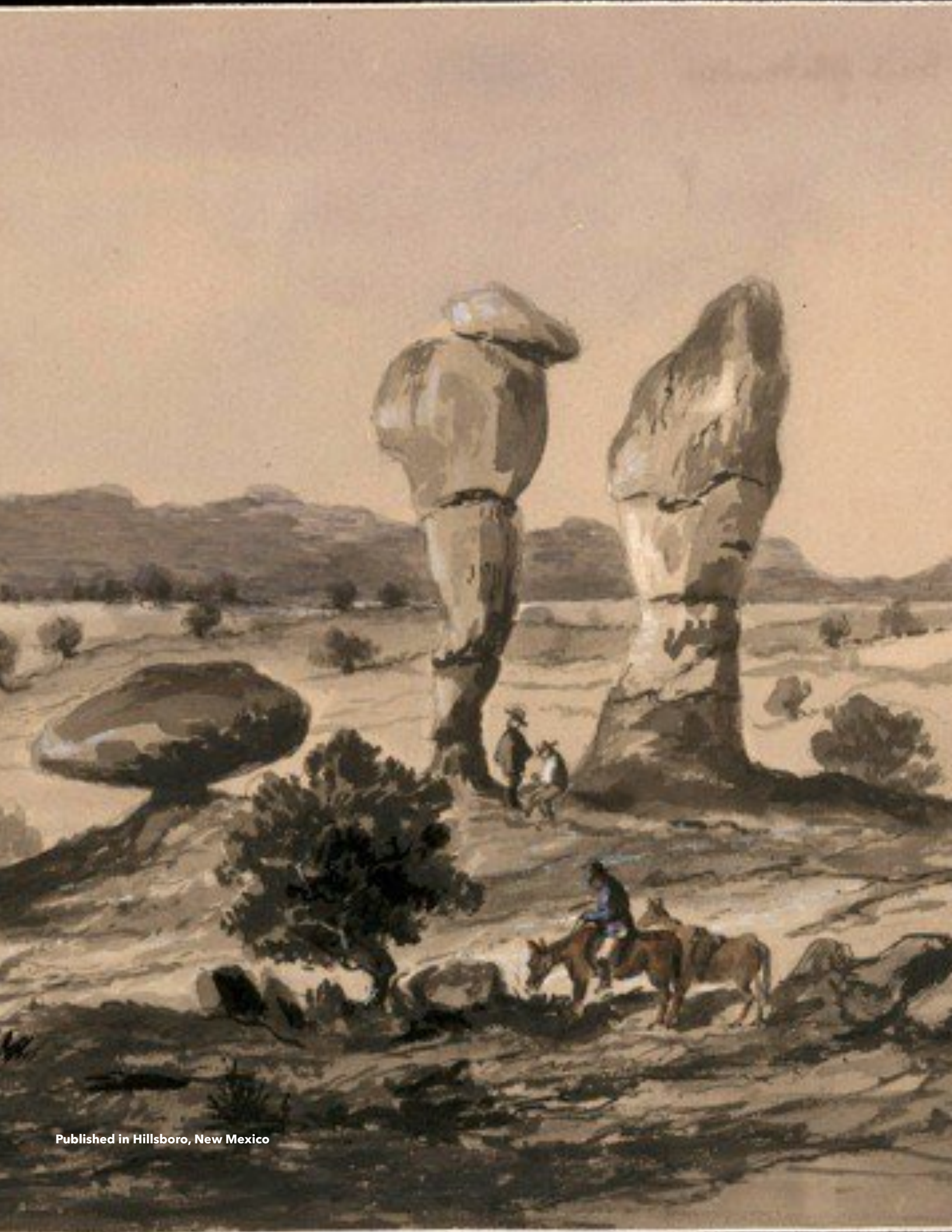
At first, the students of natural history were generalists, and indeed many might be called polymaths - meaning that they had interest in, and knowledge of, multiple fields of inquiry. By the end of the 1800's, many of the researchers were more specialized (or were knowledgeable in two or three - at the most - fields of inquiry). In this they followed a general world wide trend.

In the mid 1900's, and later, there was an attempt to counter the specialists' perspective with a more generalist approach. Studies in ecology, for instance, became more generally accepted.

This play between generalists and specialists continues today and is one of the major issues/problems/opportunities in the accumulation of knowledge. The nature of the sponsor-researcher relationship continues to be the same generally, but the particulars of those relationships continue to evolve. Commercial institutions, for instance, are becoming more active in some fields than they have been in the past.

This work is characterized more by what was left out than what was put in. It is for that reason that it contains a significant number of links to other sources – but there are many more.

- R. A. Barnes
Hillsboro, New Mexico
May 2021



Published in Hillsboro, New Mexico