EARLY NAVAHO GEOGRAPHY

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IN EARLY Navaho history, the reader is confronted with certain geographic terms that are not familiar. They are Cebolleta, Navaho and Piedra Alumbre or Lumbre. Their historical locations are essential in tracing the story of the Navaho people. Fixing the locations is partly a matter of defining words.

The Spanish word *alumbre* means alum, which is a mineral salt. "In color it may be either reddish, gray, white, streaked white, or it may have a pearly lustre."[1] This is a commercial alum which is used as a mordant in dyeing.

The word *lumbre* means fire, spark from a flint, splendour, brightness, lucidity, clearness.

The term *piedra lumbre* was used by Fray Alonso de Benavides in his memorial to New Mexico in the late 1620's. Describing the country of the Navaho people, beginning approximately from an east-west line just to the south of Mt. Taylor, he wrote of the mountainous country to the northward as follows: "This cordillera runs another fifty or sixty leagues, the which are full of deposits [*minerales*] of rock alum [*piedra lumbre*, for *alumbre*]."[2] The term *piedra lumbre* is thus translated as "rock alum," with the translator, however, taking the liberty of substituting *alumbre* for *lumbre*. It supposedly follows from Fray Alonso's words that the said mountain chain is generously endowed with this particular mineral.

Another translator of the same passage adopted that supposition: "This mountain range runs along for another fifty or sixty leagues, and for the entire distance it is covered with rock alum."[3] The author of an earlier edition of the *Memorial*

1. *The Encyclopedia Americana*, 1950. For further description and chemistry see Stuart A. Northrop, *Minerals of New Mexico*. Albuquerque, 1942 (The University of New Mexico Bulletin, Whole number 379).

2. *The Memorial of Fray Alonso de Benavides 1630*, p. 44. Translated by Mrs. Edward E. Ayer. Annotated by Frederick Webb Hodge and Charles Fletcher Lummis. Chicago, 1916. Privately printed.

3. *Benavides' Memorial of 1630*, p. 45. Translated by Peter P. Forrestal, C. S. C. Introduction and notes by Cyprian J. Lynch, O. F. M. Washington, D. C.: Academy of American Franciscan History, 1954.

did not translate the words *piedra lumbre*.[4] Benjamin M. Read translated the word as "salt petre."[4a]

In using the term *cordillera*, Fray Alonso might have been thinking of the Chuska range along the present-day Arizona-New Mexico boundary, but more likely he was describing the broken mesa country of the continental divide extending northeastward from west of Mt. Taylor toward the northwestern base of San Pedro Mountain. In this stretch of country there is one known source of alum. It is located in northwestern Sandoval County, westward from the present-day town of Cuba. Otherwise there are only a few and very scattered known deposits of this mineral in New Mexico,[5] although traces of it might be found elsewhere when protected from the elements since it is soluble in water.

Fray Alonso also stated that the Pueblo folk painted their clothing and, in order to secure the necessary ingredient, they invaded the region westward of the Rio Grande Valley to secure the material, *piedra lumbre* (heretofore translated as rock alum). The Navaho used an impure native alum in dyeing wool in the eighteenth century,[6] but there is no definite information that the Pueblo people used it in Benavides' day, nor does its scarcity support his statement about the source of supply. A mineral that the Pueblo artist did use in decorat-

The Spanish text reads: "Esta cordillera corre otras cincuenta ò sesenta leguas, las quales estàn llenas de minerales de piedra lumbre." Ayer edition, *op. cit.*, p. 137.

4. Alonso de Benavides, "Memorial on New Mexico in 1626," New York Public Library, *Bulletin*, 3:417-28, 481-99 (Jan. to Dec. 1899).

4a. *Illustrated History of New Mexico*, p. 689 (1912).

5. Stuart A. Northrop, *Minerals of New Mexico*. Albuquerque: University of New Mexico, 1942.

On the South side of Mt. Taylor "there is a small deposit of alum. The deposit is an encrustation covering a few square feet around a seep at the top of a shale parting in the sandstone at the base of the Mulatto tongue of the Mancos shale." C. B. Hunt, "The Mount Taylor Coal Field," p. 53. United States Geological Survey, Bulletin 860-B, 1936. (Geology and Fuel Resources of the Southern Part of the San Juan Basin, N. Mex., pt. 2).

6. Washington Matthews, "Navajo Dye Stuffs," p. 613. Board of Regents of the Smithsonian Institution, *Annual Report*. Washington, 1893. Charles Avery Amsden, *Navaho Weaving: Its Technic and History*. Santa Ana, Calif.: The Fine Arts Press, 1934. The Franciscan Fathers, *An Ethnologic Dictionary of the Navaho Language*, pp. 228-234. Saint Michaels, Arizona, 1910.

"This was a low-grade, naturally occurring alum used by the Navajos, Moqui and Zuñi as a specialized mordant in dyeing processes. It is still gathered from under large rocks in the flat reservation country of New Mexico (Stella Young, *Navajo Native Dyes* [Chilocco, 1940], pp. 8, 18)." *Ibid.*, p. 45, note 101.

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ing *pottery* was iron oxide. Azurite, "a blue carbonate of copper," was also suitable for a pigment.[7]

If the Pueblo people invaded the Navaho country and fought those people for materials used in dyeing, as Fray Alonso records, these other minerals were probably the ones they sought. Another possibility for fighting lay in the Pueblos' use of a yellow stuff or pigment (used for coloring walls) which was secured from a site near the present-day town of Tierra Amarilla.[8] Furthermore, they were interested in securing "native chert and flinty material" from the ancient mine workings along the south side of Cerro Pedernal (Flint Hill),[9] a few miles west and south of Abiquiu, which could be used in fashioning weapons and craft tools; "material which is undoubtedly from this site is found abundantly [among the abandoned Pueblos] as far down the

7. "Frequently found in Chaco ruins unworked, in beads, and powdered for pigment. Probably derived from the Zuñi mountains, or from isolated patches in the Navajo (old usage) sandstone in the Dutton plateau." Donald D. Brand, Florence M. Hawley, Frank C. Hibben, *et al*, "Tseh So, A Small House Ruin. Chaco Canyon, N. M." The University of New Mexico *Bulletin*. Anthropology Series, vol. 2, no. 2, p. 55 (Whole no. 308, 1937).

There was probably no need for alum in decorating pottery because clay contains some alumina or alum. "Clay is composed of silica combined with alumina. A sufficient quantity of this added to the lead carbonate would make the liquid flow smoothly when applied as paint; it would also retard the settling out of the heavy lead carbonate.

"Clay in the glaze paint could account for the considerable amount of silica and alumina found in the analysis. It is not necessary, however, to postulate the addition of clay to the liquid paint, for clay is present in abundance in the slip and paste of the potter, and, during firing, this would be attacked by the excess lead oxide." Florence M. Hawley and Fred G. Hawley, "Classification of Black Pottery Pigments and Paint Areas," p. 27. The University of New Mexico *Bulletin*. Anthropological Series, vol. 2, no. 4 (Whole no. 321, 1938).

"Copper oxide is rather rare in nature. There are, however, two carbonates which are fairly common—green malachite and blue azurite. Both of these minerals were known and commonly used for paint by the Pueblo Indians." *Ibid.*, p. 26.

There is no light thrown on the use of *alum* for dyeing by the Pueblo people in Amsden, *op. cit.*; Roland F. Dickey, *New Mexico Village Arts*. Albuquerque: The University of New Mexico Press, 1949; Harry R. Tschopik, Jr., *Navaho Pottery Making*. Cambridge, 1941 (Papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University, vol. 17, no. 1); Florence M. Hawley, "Chemistry in Prehistoric American Arts," *Journal of Chemical Education*, vol. 8, no. 1 (January, 1931).

8. J. P. Harrington, "The Ethnogeography of the Tewa Indians," Bureau of American Ethnology, *Twenty-ninth Annual Report*, p. 112 (1916).

9. Cerro Pedernal in the Tewa Indian language is known as the flaking stone, flint, or obsidian mountain. *Ibid.*, p. 122.

Frank C. Hibben states that the Tewa word is *Tsiping* which means "flaking stone," or "pointed stone mountain." "Excavation of the Riana Ruin and Chama Valley Survey," p. 15. University of New Mexico *Bulletin*, Anthropology Series, vol. 2, no. 1 (Whole no. 300, 1937). He apparently relies on Harrington, *op. cit.*

Chama as the Rio Grande."[10] Similar materials also could have been found in the valley of the Rio Puerco of the East, a region where the Pueblo "paint seekers" would have encountered Navahos.[11]

The better translation for the statement by Fray Alonso that the mountains in the Navaho country are full of "minerales de piedre lumbre" than the one heretofore accepted is that he was speaking of "minerals of colored rock" rather than rock alum. He used the plural form of the word for mineral; he also wrote *lumbre* and not *alumbre* which means alum.[11a] This translation fits with the geological formations of northwestern New Mexico. The area is marked by lava flows and considerable exposure of the Cretaceous formation: "Underlying the lavas of the Taylor and Acoma plateaus, its

10. *Ibid.*, p. 15f.

Chert: "An impure, brittle, usually grayish-colored quartz. Chert is sometimes called hornstone; also the term chert is often applied to any impure flinty rock, including jaspers. The usage of the term in archaeologic reports is uncertain. Used for artifacts in the same manner as chalcedony. Pebbles of gray, brown, and black chert are found in the nearby Morrison, Ojo Alamo, and Torrejon formations; but possibly much of the chert used in the Chaco area (and all over northern New Mexico) came from the prehistoric quarries on the flank of the Cerro Pedernal in the Chama drainage." Donald D. Brand, *et al*, *op. cit.*, p. 56.

A large ceremonial hornblende spearhead has been found in a Chama Valley pueblo excavation. J. A. Jeançon, "Excavations in the Chama Valley, New Mexico," p. 20. Bureau of American Ethnology, *Bulletin 81* (Washington, 1928). Hornblende is found in volcanic rocks near Abiquiu Peak (the same or a sister peak of Cerro Pedernal). Northrop, *Minerals*.

For further description of the geology and mineralogy of the Piedra Lumbre see E. D. Cope, "Report on the Geology of that part of northwestern New Mexico examined . . . 1874," Secretary of War, *Report*. 44 cong., 1 sess., hse. ex. doc. 1, pt. 2, pp. 981-1017 [1676] and O. Loew, "Geological and Mineralogical Report on Portions of Colorado and New Mexico," *Ibid.*, pp. 1017-1036.

11. Geo. M. Wheeler, *Report Upon Geographical and Geological Explorations and Surveys West of the One Hundredth Meridian*, 3:525f. Washington, 1875. Hunt, "Mt. Taylor Coal Field," p. 51. James H. Gardner, "The Puerco and Torrejon Formation of the Nacimiento Group," *Journal of Geology*, 18:719 (1910).

"About 70 per cent of the pebbles of the Ojo Alamo are of jasper, variously colored chert, or pink or white quartzite. Of the remainder, pebbles of sandstone, andesite, felsite, porphyrite, gneiss, and schist are fairly common, and pebbles of granite and obsidian are also present. Practically all the pebbles are well rounded. They range in size from sand grains to a few that are 6 inches in diameter." Clyde Max Bauer, "Stratigraphy of a part of the Chaco River Valley." United States Geological Survey, Professional Paper 98-P, p. 276 (1916).

11a. A quarter century earlier, the first Governor of New Mexico, Don Juan de Oñate, made the statement: "From the metals that we find here, we can obtain all colors and the finest." George P. Hammond and Agapito Rey, *Don Juan de Oñate: Colonizer of New Mexico, 1595-1628*, 1:484. The University of New Mexico Press, 1953 (vol. 6, Coronado Cuarto Centennial Publications, 1540-1940. George P. Hammond, general editor).

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exposure forms a belt around each of them. Overlying the Trias and Carboniferous, which appear in the Zuni uplift, its exposure encircles that also, except where covered by lava. In like manner it flanks the Nacimiento uplift on the west and south. North of the Zuni range and the Taylor plateau, and west of the Nacimiento range, it covers the country to the limit of our survey."

"The Cretaceous rocks are an alternating series of sandstones and shales, in which the sandstones are yellow, and the shales gray and yellow, with bituminous layers and coal. In the upper part of the series, the sandstones incline to green, and are soft; in the lower, they incline to orange, are harder, and form heavier beds."[12] The lava and other strata contain a variety of colored stones.

Piedra lumbre as a geographical place name became applied to two localities in New Mexico. The one later in point of time and of little historical significance is an arroyo in the Navaho country west of the present-day town of Cuba. When Colonel J. M. Washington led a military force into the Navaho country in 1849, Jemez Pueblo was the jumping-off place. Traveling in a generally northwest direction beyond the neighborhood of Cuba, the expedition crossed an "insignificant" tributary of the Rio Puerco "which drains the valley called Canada de Piedre de Lumbre."[13] This valley drains into the Cañon de Torreon which in turn is a western tributary of the Rio Puerco of the East.[14] The "valley" or arroyo is marked by volcanic action.

12. Wheeler, *Report upon Geographical . . . ,* 3:543f.

A lava flow overlays the Cretaceous northward from Mt. Taylor, and it too could add to the colored appearance of the country: "The variety of trachyte most widely distributed is of light color, the characteristic hue being pale-yellow, and is usually of light weight. Imbedded crystals of feldspar are nearly always visible, and occasionally quartz, mica, and hornblende. I have rarely detected an iron oxide, but the rock is usually magnetic."

Ibid., p. 526. Chert "color runs the whole gamut of the rainbow." Hibben, "Excavation of the Riana Ruins . . . ," p. 15.

13. James H. Simpson, *Journal of a Military Reconnaissance, from Santa Fé, New Mexico, to the Navajo Country.* Philadelphia, 1852.

14. There are three Rio Puercos in New Mexico. For the sake of clarity I shall refer to them as the Rio Puerco of the West which flows into the Little Colorado River; the Rio Puerco of the East which rises on the northwestern slope of the Nacimiento Range and flows southward into the Rio Grande; and the Rio Puerco of the North which is a short tributary of the Rio Chama in north-central New Mexico.

For a geological description of the Arroyo Torreon see O. Loew, *op. cit.*, p. 1024.

Farther northward another and much earlier named *Piedra Lumbre* has been recorded since the seventeenth century. It is the region at the junction of the Rio Puerco of the North and the Rio Chama, a locality of bright colored rock formations. An eye witness description of a century ago illustrates very well how the geographical term could have arisen.

Captain J. N. Macomb led a government exploration party northwestward from Santa Fe in 1859, following the route later dubbed by historians as the "Old Spanish Trail." J. S. Newberry, a geologist, accompanied the expedition. He did a little sightseeing by deviating from the line of march, ascending Abiquiu Peak (Cerro Pedernal). "Almost beneath us [he wrote] was the junction of the Puerco and Chama, in a broad valley of excavation, as red as blood, from the exposed surfaces of the eroded marls; farther west, higher table lands, composed of the yellow and blue rocks of the Lower and Middle Cretaceous."[15] Rejoining the party on the trail leading up the Arroyo Seco on the north side of the Rio Chama, he was charmed with the fantastic forms of the surrounding buttes: "Their colors are exceedingly brilliant, crimson and orange being the most conspicuous. The vivid green and level valley is framed by these colored cliffs. . . ."[16]

This particular region of colored rocks is of course in a mountainous country. In the seventeenth century, the term *cordillera* or mountain was linked with Piedra Lumbre (or Alumbre). When Juan Domínguez de Mendoza was commissioned by Governor Otermín (1677-1683) to lead an expedition against the Navahos in 1678, he was instructed to travel westward from the Pueblo of Zia, at the southern end of the Jémez Range, "to the cordilleras of Casa Fuerte Navajo, Río Grande, and their districts. . . ." On the return trip he was to "set out to the cordillera of the Piedra Alumbre and march through that Territory" where the enemy came to strike at the settlements in the Rio Grande Valley in the Santa Fe area.[17] (Without further discussion at this point,

15. J. S. Newberry, *Report of the Exploring Expedition from Santa Fé, New Mexico, to the Junction of the Grand and Green Rivers of the Great Colorado of the West in 1859*, p. 70. Washington: U. S. Engineering Department, 1876.

16. *Ibid.*, p. 70.

17. Commission as Lieutenant General to Juan Domínguez, Santa Fe, July 12,

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the Rio Grande mentioned is the Rio San Juan in northwestern New Mexico.) The instructions imply that Captain Domínguez returned by way of the Rio Chama Valley, through the Piedra Lumbre.

Nearly a century later, a land grant was made to José de Riaño (or Reaño) in the Rio Chama Valley west of Abiquiu. The boundary of the grant included the valley of Piedra "Alumbre." On the south it was marked by the Cerro Pedernal, on the west by a mesa adjoining the Cañon de la Piedra "Alumbre," and on the north by some red bluffs. The title documents also read: "to the west of the Pueblo of Abiquiu at a distance of three to four leagues there is a valley commonly called 'de la Piedra Alumbre'. . . ."[18]

The valley literally to the "west" of Abiquiu is that of the Rio Puerco of the North. The mesa referred to as the western boundary is the Mesa Prieta. As mapped by the United States Geological Survey, the Mesa Prieta is at the junction of the Rio Puerco of the North and the Rio Chama, west of the former and south of the latter. Across the Canyon of the Rio Chama to the north, the high country is named Mesa de Los Viejos. The land grant boundary line as subsequently surveyed in the late nineteenth century included the lower stretch of the Rio Puerco, the line running along the base of the Mesa Prieta. It continued along the eastern base of Mesa de Los Viejos in a northeastern direction to a point at the apex of the upper Arroyo Seco, then turned sharply to the southeast and, with varying directions, to the east and south to the Rio Chama.[19]

If the lower stretch of the Arroyo Seco along the northern side of the Rio Chama is accepted as lying to the west of the "Pueblo of Abiquiu," although it is to the *northwest*, then it

1678. Documents, 81, 82. *Biblioteca Nacional Madrid*, Ms. 19258. This document with translation was provided by France V. Scholes who, with Miss Eleanor B. Adams, will annotate the Dominguez Papers for publication in the Coronado Historical Series under the general editorship of George P. Hammond, cited hereafter as *Dominguez Papers*.

18. Piedra Lumbre Grant (1766), R73 (F152). Federal Land Office, Santa Fe, New Mexico. There is a microfilm of this archive in the Library, University of New Mexico.

19. United States Department of the Interior, Geological Survey. *Quadrangle maps:* Echo Amphitheater, Youngsville, Ghost Ranch, and Cañones. New Mexico, 1953.

The Arroyo Seco sometimes appears on other maps as Rito del Canjilon (cangilon). The latter is also sometimes designated as a tributary of the Arroyo Seco.

could be the valley of historical interest. The eastern portion of this valley, as now marked on the Geological Survey map, is named Llano Piedra Lumbre. The western portion, across the arroyo channel, is named Llano del Vado. At the apex of the valley are the red bluffs mentioned in the title papers to the land grant, and so vividly described in the words of J. S. Newberry.

A decade after the land grant, the Domínguez-Escalante expedition, seeking to learn more about the distant country to the northwest of Santa Fe, and with an eye to the possibility of opening a route to Monterey, California, passed this way. Fray Silvestre Vélez de Escalante kept a diary of their experiences. Traveling along the Rio Chama to a point about five miles west of Abiquiu, "We then turned northwest [Fray Silvestre wrote], and having gone about three and a half leagues over a bad road, for in it there are some small and very stony mesas, we halted for siesta on the north side of the valley of La Piedra Alumbre, near Arroyo Seco."[20] The journalist also recorded: "They say that on some mesas to the east and northeast of this valley, alum rock and transparent gypsum are found."

The cartographer of this expedition, Bernardo de Miera y Pacheco, prepared an excellent map of their travels.[21] A range of hills is marked parallel to and on the north side of the Rio Chama to where it turns northward just above Abiquiu. Along the base of the hills is inscribed the words Piedra Alumbre. A second parallel range to the north is marked Sierra del Cobre, a mountain well known to the eighteenth century Spaniards. The absence of the word Sierra in connection with Piedra Alumbre implies that the term was used

20. As translated in Herbert E. Bolton, *Pageant in the Wilderness*, p. 133. Salt Lake City: Utah State Historical Society, 1950. A reprint from the *Utah Historical Quarterly*, vol. 18 (1950).

The authorship of this Diary of the Domínguez-Escalante expedition has been credited heretofore to Fray Silvestre, but a scholarly re-examination of the matter by Miss Eleanor B. Adams and Fray Angelico Chavez has led to the judgment that Fray Atanasio Domínguez was the senior member of the expedition and is entitled to the credit of joint authorship of the Diary. For further discussion see Adams and Chavez, *infra* note 22.

21. A colored reproduction of the Miera y Pacheco map is in Bolton, *op. cit.* A black and white reproduction in Amsden, *Navaho Weaving*. And an enlarged microfilm copy in *Historia 86* (pt. 8, Coronado Library, University of New Mexico).

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just as recorded by Fray Silvestre; that is, it referred to the valley. However, he did not mention that alum was found in the valley; *if* it existed as "they say," it was to be found some place northeastward from the valley.

On a map prepared for Governor Anza in 1779 by the same cartographer, the words Piedra Alumbre are inscribed along the *south* side of the Rio Chama in the same locality. At first glance, the upper Rio Chama Valley would be the Piedra Lumbre. The Arroyo Seco, marked on the map correctly, has no label attached to it.[22] The map markings imply that the term meant the general region of colored rocks that marked the area where the Rio Puerco of the North and the Arroyo Seco, a few scant miles apart, join the Rio Chama. And this is the way it was used a century after Fray Silvestre and his companions took their siesta in the Arroyo Seco.

Antonio Atencio, native New Mexican, eighty-five years of age, knew of two places named Piedra "Lumbre"; one was the arroyo to the west of Cuba: "The other place called Piedra Lumbre is beyond the Chama river and in fact right on the river, near where the Chama and the other Rio Puerco joins." Bartolo Padilla, age sixty-three, knew that "the Piedra Lumbre is between the Rio de Chama and the Cerro del Pedernal," which is south of the Rio Chama. "It is a prairie (llano)," he said, "and the whole vicinity is known by that name." Residents of Copper City, a one-time settlement near Cuba, protested against confirmation of the title to the San Joaquín del Nacimiento land grant in the 1880's. Their petition read that, "The 3rd boundary line is to the east along the skirts of that range of the Zuni [Jemez] mountains which extends to the *Flint Stone* (piedre lumbre) and looks toward said Pueblo" of Abiquiu.[23] The *Flint Stone*, of course, meant the Flint Hill (Cerro Pedernal).

The word Navaho was early adopted by the Spanish as

22. Eleanor B. Adams and Fray Angelico Chavez, eds., *The Missions of New Mexico, 1776*, p. 288. Albuquerque: The University of New Mexico Press, 1956.

In nineteenth century geographical terminology, the range of hills immediately north of the Rio Chama opposite the present-day village of Abiquiu was the Cerro Cobre (Sierra del Cobre). This explains the difference in location of the place names on the two maps of 1776 and 1779. In other words, the range immediately parallel to the river was and is the Sierra del Cobre. Court of Private Land Claims, Case #52. Federal Land Office, Santa Fe, N. M.

23. All these quotations are from the title papers, R 66 (F 134), Federal Land Office, Santa Fe, New Mexico.

the name for the homeland of a group of Apache folk who moved into north-western New Mexico prior to the arrival of the white man. It was applied in a vague way to the region lying west and northwest of Nacimiento Mountain, but also acquired a more specific geographical meaning. The first known recorded use of the name is found in the writing of Father Gerónimo de Zárate Salmerón, a contemporary of Fray Alonso Benavides. Curious to learn more about a nation that lived farther away than these Apaches, he inquired at the Jemez Pueblo about the possibility of securing a guide to visit them. His hosts replied, "[One only had to] go out by way of the river Zama; and that past the nation of the Apache Indians of Navajú there is a very great river . . . and that the river suffices for a guide."[24]

The meaning of the name was first explained by Fray Alonso. Discussing the several Apache groups in the Southwest, he stated that "these of Navajò are very great farmers [*labradores*], for that is what 'Navajò' signifies—'great planted fields' [*sementeras grandes*]."[25] Modern scholarship supports Fray Alonso's statement. Edgar L. Hewett, writing in 1906, explained the origin of the name as follows: "In the second valley south of the great pueblo and cliff village of Puye in the Pajarito Park, New Mexico, is a small pueblo ruin known to the Tewa Indians as Navahú, this being, as they claim, the original name of the village. The ruined villages of this plateau are all Tewa of the pre-Spanish period. This particular pueblo was well situated for agriculture, there being a considerable acreage of tillable land near by. . . . ." The Tewa Indians assert that the name "Navahú" refers to *"the large area of cultivated lands."*[26] Many years later, John P. Harrington stated that "The Tewas still use

24. Translation in Charles F. Lummis, *The Land of Sunshine*, 12:188 (Los Angeles, 1900). The quotation can also be found in Amsden, *Navaho Weaving*, p. 127. The Spanish document is printed in *Documentos para la Historia de Mexico*. Tercera Serie, Mexico, 1856; it is entitled, "Relaciones de Todas las Cosas que en El Nuevo-Mexico se han visto y sabido, asi por mar como por tierra, Desde el Año de 1588 hasta el de 1626, por el Padre Geronimo de Zarate Salmeron. . . ."

The portion dealing with Oñate's trip to the South Sea is printed in Herbert E. Bolton, *Spanish Explorations in the Southwest 1542-1706*. New York: Chas. Scribner's Sons, 1916. This version must be used with caution.

25. *Memorial 1630*, p. 44. Ayer edition.

26. "Origin of the Name Navaho," *American Anthropologist*, ns. 8:193 (1906). This passage can also be found in Benavides' *Memorial 1630*, p. 266, note 45. Ayer edition.

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the compound noun 'návahúu' (in Spanish, 'arroyon enmilpeado') to designate a large arroyo with cultivated fields—a perfect description of the old-time Navaho region, with its cultivated fields in canyons."[27]

The "old-time Navaho region" is not too difficult to locate. The Spanish had occasion to become acquainted with the locality when they began to have trouble with these people in the seventeenth century. As early as 1663, Captain Nicolas de Aguilar referred to the Apache people "in the jurisdiction of Casa Fuerte and Navajó. . . ."[28] This statement implies two localities for this branch of the Apaches.

In the Juan Domínguez documents, a double and sometimes triple-word term appears. The Spanish were having difficulty in the decade of the 1670's with the Apache people "of the Río Grande, Nabajo, and Cassa-Fuerte . . .," or "the cordilleras of Navajo, Casa Fuerte, and the other places. . . . ." And again, "the cordilleras of Casa Fuerte Navajo, Río Grande, and their districts. . . ." Or "the said cordilleras of the west, of Casa Fuerte, Navajo, peñoles, and other places. . . ."[29]

When Fray Alonso de Posadas prepared his description of New Mexico a decade later, he clearly applied the name *Rio Grande* to the river known today as the Rio San Juan, which flows across the northwestern corner of New Mexico.

27. "Southern peripheral Athapaskawan origins, divisions, and migrations," *Smithsonian Miscellaneous Collections*, vol. 100. Washington, D. C., 1940 (Essays in Historical Anthropology of North America). See also Barbara Aitken, "Letter," June 5, 1951. *New Mexico Historical Review*, 26:384 (1951).

The suggestion has been advanced that the name derives from the Spanish word *navaja*, meaning a clasp knife or razor, because warriors carried great stone knives; or from *nava*, meaning a field or flat land. The Franciscan Fathers, *An Ethnologic Dictionary of the Navaho Language*, pp. 28, 26.

Since the word is not Spanish in origin, but Tewa Indian, there is no compelling reason to retain the older Spanish spelling, *Navajo*. The English form of *Navaho* can be pronounced correctly in an English speaking society, and therefore lends itself more readily to popular usage without difficulty. This point has been well reasoned by Berard Haile, O. F. M., "Navaho or Navajo?". *The Americas*, 6:85-90 (July, 1949).

The spelling *Navajo* was adopted through ignorance of the derivation of the word and was subsequently dropped by scholars when the truth was learned. F. W. Hodge, "The Name 'Navaho.'" *The Masterkey*, 23:78 (May, 1949).

The Navaho people call themselves diné or diné, meaning men or people. Franciscan Fathers, *op. cit.*

28. Charles Wilson Hackett, ed., *Historical Documents relating to New Mexico, Nueva Viscaya, and Approaches Thereto, to 1773*, 3:143. Washington, D. C.: Carnegie Institution of Washington, 1937.

29. *Domingues Papers*, Docs. 23, 29, 31-33.

He also mentioned the Rio Colorado of the West and the Rio Grande del Norte of central New Mexico, rivers which retain those names to this day; so there is no confusion in his own mind about river locations, nor does he leave any doubts in a reader's mind: in reaching the Rio Grande (San Juan), he wrote, "one passes by the mountains which they call casa fuerte or Nabajó. . . ."[30]

Nearly a century later, Fray Silvestre, who took the siesta in the Piedra Lumbre, stated that this river, "which then they called *Grande*, today is named Nabajo. . . ."[31]

The change in name from Rio Grande to Rio Navaho occurred sometime during the third quarter of the eighteenth century. As late as 1749 it was referred to as Rio Grande.[32] Fray Silvestre explained in the diary of 1776 that a small stream named "Río de Navajó," flowing from the east, joined the "San Juan River." Below the junction point, the stream was called "Río Grande de Navajó because it separates the province of this name from the Yuta Nation."[33] Today the stream is known throughout its length as the Rio San Juan. However, the eastern-most tributary still bears the name of Rio Navaho.

Since the Rio Grande de Navaho separated the Utah (or Ute) Indians from the Navaho, the country of the latter lay south of the river. And it was to this region that the name Navaho became applied as the homeland of those people. The expression Casa Fuerte was not used in the eighteenth century, nor was the word *cordillera* continued in use. On the

30. "Copia de un Informe hecho à Su Magd. sobre las Tierras del Nuevo Mexico." Archivo General Nacional, *Historia 3* (Part 1, p. 82. Coronado Library, University of New Mexico).

A printed copy is in *Documentos para la Historia de Mexico*, Tercera serie. Mexico, 1856.

31. Fray Silvestre Velez de Escalante, "Extracto de Noticias." *Biblioteca Nacional Mexico 3* (Pt. 1, photo 212, Coronado Library).

A partial copy of this document is in A. G. N., *Historia 2* (Part 2, Coronado Library). It is entitled *Restauración del Nuevo México por Don Diego de Vargas Zapata*. It has been printed in *Documentos para la Historia de Mexico*, Tercera Serie. Mexico, 1856. It was a resume of the Spanish archives of New Mexico at Santa Fe. Fray Silvestre has been established as the author by J. Manuel Espinosa, *Hispanic American Historical Review*, 22:422-25 (May, 1942).

32. Fray Juan Miguel de Menchero to Gov. Véles Cachupín as quoted in Juan Francisco de Guemes y Horcazitas to Gov. Veles, Mexico, October 18, 1749. *New Mexico Originals*, PE30 (Bancroft Library, Berkeley, Calif.).

33. Bolton, *Pageant in the Wilderness*, p. 187f.

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contrary, expressions such as "province" of Navaho, *rancherias* of Navaho, and Apache Navaho became the common terms.[34] But of these three terms, the "Province of Navaho" was without doubt the specific name for a particular geographical region, that of the "great planted fields" where a branch of the Apache people lived; and this Province was in the drainage area of the Rio San Juan. In time, descendants of the Apaches living there simply became known as Navahos.

The Province of Navaho included the canyons that stem in a southeasterly direction from the Rio San Juan where it flows in a southwesterly direction in New Mexico. Writing in 1778, Fray Silvestre implied that the Navahos lived on both sides of the Rio San Juan, but I doubt that this was so, except possibly in a few instances. Testimony in official hearings held by Gov. Joachin Códallos y Rabál (1743-49) in 1743 to learn more about the Province of Navaho made it very clear that the Indians lived south of and away from the river. In fact, the Rio Grande (San Juan) was referred to as being *outside* of the Province of Navaho at a distance of about ten or more miles, depending upon the point of departure used by an informant in reckoning the distance. The Navahos lived on the tops of the hills for maximum security against Indian or Spanish attacks, and cultivated the spots in the canyon below where water was available from spring or rainfall. They ranged as far east as the Piedra Lumbre and raided into the Rio Grande Valley, but their habitations were in the tributary canyons of the Rio San Juan. In one specific instance the term "Canada Grande larga" was used in describing the region.[35]

34. Statement of Maestre de Campo Roque Madrid, January 8, 1710. *Provincias Internas 36*, expediente 8 (typewritten copy, pp. 78, 81. Edward E. Ayer Collection, Newberry Library, Chicago). Statement of Fray Juan de Tagle, October 17, 1705. *Ibid.*, expediente 5, p. 126. Statement of the Cabildo of Santa Fe, October 13, 1705. *Ibid.*, p. 134. And see N. M. A., doc. 199.

35. *Sarjento Maiór Don Joachin Códallos y Rabal Governador y Capitan General de la Nueva Mexico. Testimonio á la letra de los Auttos que originales se remiten al superior Govierno del Exmo Señor Conde de Fuenclara . . . Sobre La Reducion de los Yndios Gentiles de la Provincia de Navajo al Gremio de Nuestra Santta Madre yglecia, Febrero 26, 1745.*

This manuscript will be referred to hereafter as *Códallos y Rabal Ms.* It is to be found in the Bancroft Library in a file labeled *New Mexico Originals*, reference number PE24.

An imperfect translation has been published: W. W. Hill, *Some Navaho Culture Changes During Two Centuries.* Washington: The Smithsonian Institution, 1940 (Smithsonian Miscellaneous Collection, vol. 100 (Whole volume).

See also Escalante, "Extracto de Noticias," and Van Valkenburgh in Roy Malcom, "Archaeological Remains, supposedly Navaho, from Chaco Canyon, New Mexico," *American Antiquity*, 5:8 (July, 1939).

"The Canada Grande larga" no doubt is the Canyon Largo on present day maps. It is the longest of the canyons in the region under discussion. About eight miles from the junction with the valley of the Rio San Juan, Canyon Blanco branches to the south from Canyon Largo. Between these two canyons, the tableland is known as the Mesa Cibola, and on this mesa lived a concentration of Navaho people in the eighteenth century who were very much concerned about defense:[36] "Most of the sites were fortified. Towers of the *upper* Largo were strategically located on buttes and high points above the canyon and so placed in relation to each other that they formed a chain of observation points. Fortification walls were common. Buttes and Mesa points often had walls along their edges or across narrow places. A wall two hundred feet long was located on a mesa rim in upper Blanco Canyon. Some sites were located in strategic positions in relation to trails."[37]

Tree ring studies of Navaho dwellings in the upper Largo and Blanco canyons reveal a possible range in time from 1735 to 1777. An archaeological survey of the several canyons eastward and northward from Blanco Canyon as far as Pueblito Canyon revealed evidence of Navaho occupancy in Pueblito Canyon as early as 1656 ± 20.[38] And a few ring specimens from Governador Canyon date the occupation as early as 1491 + X to 1541 ± 20, "which places the Navajo in the Governador at a time verging on the prehistoric."[39]

36. I am using the following maps for current geographical terminology: Department of the Interior, Office of Indian Affairs, Navaho Service, *A Geographical and Historical Map of the Navajo Country*. Window Rock, 1940. United States Department of the Interior, Geological Survey, *New Mexico Base Map*, 1955 (Provisional edition).

37. Malcom F. Farmer, "Navaho Archaeology of Upper Blanco and Largo Canyons, Northern New Mexico," *American Antiquity*, 8:66 (July, 1942).

John P. Harrington states that the original homeland according to Navaho legend was Largo Canyon (Tinétxah). They shifted east to around Stinking Lake (Burford Lake) and then expanded to the west and south. "Southern peripheral Athapaskawan origins . . . ," p. 515.

38. *Ibid.*, p. 71. Dorothy L. Keur, "A Chapter in Navaho-Pueblo Relations," *American Antiquity*, 10:84 (1944).

39. Edward Twitchell Hall, Jr., "Recent Clues to Athapascan Prehistory of the

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The Province of Navaho was not the only location for this branch of the Apache people who came to be known by the name of Navaho. Seventeenth and eighteenth century notions located them in the region extending from Mt. Taylor northward to the Rio San Juan, in keeping with Fray Alonso's account of the 1620's. In the latter half of the eighteenth century, they spread westward into the Chuska range. Meanwhile, they did have one other specific location. When Captain Roque de Madrid invaded the Province of Navaho in 1705, he pursued the inhabitants who fled to the *penoles* or mountainous retreat toward the south for a distance of two *jornadas*, or two days journey. There he attacked them and was repulsed.[40]

The *penoles*, or *castillejos* as they were sometimes called, are the volcanic necks and sandstone crowned mesas that dot the valley of the Rio Puerco of the East between Mesa Prieta east of the river to Cebolleta Mountain on the west. El Cabezon is the most prominent of the volcanic necks and marks approximately the northern limit of their distribution. Cebolleta Mountain is a long level lava-topped mesa that extends northward from the highest peak in the general region which is known at Mt. Taylor. The peak itself is an old volcanic cone, but it is not the origin of the lava on Cebolleta Mountain. There were numerous volcanic outlets along the Mountain of later age than Mt. Taylor. "The flows are basalt or andesite, and their maximum thickness is about 100 feet. Most of them, however, are around 65 feet thick."[41] As the underpinning weathers away, large chunks of lava break off and lie on the slope of the mesa. These impede the actions of men on horseback very much to the advantage of defenders on top. And it was just such a difficulty that Captain Madrid experienced.

Southwest," *American Anthropologist*, n. s. 46:100 (1941). Keur, *op. cit.*

A suggestion that the Navahos may have resided as far east as the Gallinas Canyon is advanced by Frank C. Hibben, "The Gallina Phase," *American Antiquity*, 4:181-6 (October, 1938).

40. Escalante, "Extracto de Noticias."

41. Hunt, "The Mount Taylor Coal Field," p. 58. Wheeler, *Geographical and Geological Explorations . . .*, 8:587.

"The Cretaceous region is characterized by innumerable *mesas*, or tables, the tops of which are sandstone, and the bases, shale." *Ibid.*, 8:545.

A mesa to the north of Cebolleta Mountain could have served as the site of the Captain's predicament in-so-far as distance on this particular flight is involved, and evidence of Navaho occupation has been found there. At the base of Western Chacra Mesa, some eight miles east of the old ruin of Pueblo Bonito, there are old Navaho hogan sites. They have not been dated and might be fairly recent.[42] However, the Chacra Mesa was not as suitable for defense as Cebolleta Mountain.

The mesas in general slope toward the north and have their escarpments on the southern side. They were not suitable for defense against determined foes because their tops could be reached from the northern side. Cebolleta Mountain on the other hand was defensible with steep inclines and sheer cliffs on all sides. Furthermore the Navaho country was described in the eighteenth century as "beginning from the small castles *(castillejos)* which are at a distance of twelve leagues (thirty miles) to the west from Jemez pueblo. . . ."[43] This fits very well with the location of Cebolleta Mountain and the nature of its geography.

As for the time of occupation, the Navahos had been located there since the sixteenth century. When the Espejo expedition marched westward from Zia Pueblo in 1583, they reached the foot of a mountain about twenty-five miles (ten leagues) away. They "found here peaceful Indian mountaineers who brought us tortillas. . . ."[44] The tortillas indicate

42. Roy Malcom, "Archaeological Remains . . . ," 5:4.

"Whatever evidence there may be on the present surface for outlines of fields or of irrigation systems must be attributed to Navajo farmers (who have cultivated plots in the canyon for anywhere from one to five hundred years) and to white settlers (who have been in the canyon for at least forty years)." Donald D. Brand, et alia, "Tseh So . . . ," p. 113.

The correct spelling for this geographical site should be: "Chacra (Amer.) An Indian rustic habitation, plantation, or farm." The site has been labeled: Chacra, chaco, chaca.

43. *Códallos y Rabal ms.* Testimony of Bustamante.

"Taking the trail from San Mateo, a Mexican village on the northern foot of Mount Taylor, to Laguna, situated southeast of this mountain, we find ourselves, on emerging from the forest, upon a high, perpendicular bluff, where a grand panorama meets the view. Before us is a wide, level country, bordered in the east by the Sierra Zandia, and in the south by the Ladrone, Madalena range, and Sierra Mimbres. The sheet of basalt on which we stand is fully 30 feet thick, and rests upon a sandstone stratum exposed to a height of 700 feet." Loew, "Geological and Mineralogical Report . . . ," p. 1027.

44. George P. Hammond and Agapito Rey, *Expedition into New Mexico made by Antonio de Espejo 1582-1583:* As revealed in the Journal of Diego Pérez de Luxán a

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that the bearers of these gifts were a corn growing people, and this was certainly true of the Navahos.

Assuming that the more common route westward from the Rio Grande Valley Pueblos in the seventeenth century was by way of Zia Pueblo, then the next contact with the Apaches (that is, Navahos) of Cebolleta was experienced by Vicente de Zaldívar in 1599. By order of Governor Juan de Oñate, he explored the country to the west. With a small detachment of twenty-five men, he traveled more than two hundred leagues inland, "traversing many nations of warlike people, such as the Apaches, who are very numerous and extend for more than two hundred leagues, judging by what I have seen, and that I left them all at peace and friendly." So far, his description of the location of the Apaches is very general and no doubt exaggerated in area, unless groups west of the Moqui people are included in his estimate. But Zaldívar proceeded to state "that I went up the sierra with a lone companion, endangering my life, so that they could see that we intended them no harm, but treated them affectionately, presented them with gifts, and reassured them so that they served us as guides and gave us native blackberrys."[45]

Since these people of the mountain furnished guides, they were contacted early in this western expedition. Their friendliness harmonized with the experience narrated by the Espejo party. Later information about the Apaches to the westward, beginning with the writings of Zárate Salmerón and Benavides, point to Cebolleta Mountain as the most likely place to fit the story told by Zaldívar.

member of the party, p. 86. Los Angeles: The Quivira Society, 1929.

F. W. Hodge states: "I have already shown ("The Early Navajo and Apache," *American Anthropologist*, July, 1895), and my proofs have since been materially strengthened, that the Navaho were unknown to the Spaniards before Onate's time (1598), although they repeatedly crossed what later became Navaho territory. . . ." *Fray Alonso de Benavides' Revised Memorial of 1634*, eds. F. W. Hodge, George P. Hammond and Agapito Rey, p. 296, note 105. Albuquerque: University of New Mexico Press, 1945. I disagree, of course, with this judgment.

But Mr. Hodge earlier stated that a band of *Apaches* had located near the site of the later pueblo of Laguna in the days of Espejo. *History of Hawikuh*, p. 111, note 80. Los Angeles, 1937.

45. "Zaldívar's Inquiry before the Audiencia, April, 1602," in George P. Hammond and Agapito Rey, *Don Juan de Oñate: Colonizer of New Mexico 1595-1628*, p. 814. The University of New Mexico Press, 1953 (George P. Hammond, ed., Coronado Cuarto Centennial Publications, 1540-1940, vol. 6).

When Bishop Benito Crespo visited New Mexico in 1730, he journeyed to the western pueblos and commented on the possibility of obtaining a great increase in Christian converts because "the place of the pagans, called Cebolletas, is within seven leagues of the pueblo of Laguna."[46] His statement refers to the Cebolleta Mountain or one of its canyons. The present-day village of that name, north of Laguna Pueblo, did not exist in 1730.

Assuming that the Bishop's mileage was reasonably accurate, the "place of the Pagans" was the site later settled by New Mexicans, in the nineteenth century, or the village known today as Cebolleta. So these Apaches were located southward from their fortified place on Big Bead Mesa at the north end of Cebolleta Mountain. Bishop Crespo made his jaunt to western New Mexico during an era of peace between the Navaho and Spanish. The Indians therefore felt secure in the canyons along the slope of the Mountain, although they did not abandon their mesa top location.

Scarcely a generation after Bishop Crespo's visit, Fray Juan Miguel de Menchero labored to spread Christianity among the Apaches. He pleaded for assistance to work among the "pagan Apache in the mountain of Cebolleta" as he had done among the pagans of *Navaho*.[47] And by Navaho he meant the folk in the northern Province of Navaho.

In 1762, Antonio Baca petitioned for a land grant in the valley of the Rio Puerco of the East. The location was bounded on the west by "the high mountain, where the Navajo Apaches cultivate."[48]

Abundant physical evidence has been found of Navaho homesites on Cebolleta Mountain. On the north end of this highland is the Big Bead Mesa. The mountain is bounded on the north side by Arroyo Chico, a western tributary of the Rio Puerco of the East. "The evidence afforded by dendro-

46. Benito Crespo to Viceroy Juan Vásquez de Acuña, Bernalillo, September 8, 1730, in Eleanor B. Adams, ed., *Bishop Tamarón's Visitation of New Mexico, 1760*, p. 98. Historical Society of New Mexico, Publications in History, vol. 15 (1954). Also *New Mexico Historical Review*, vols. 28, 29 (1953-1954).

47. Menchero to Señor Theniente General de este Reyno, Archivo General de Indias, *Mexico 89-2-17* (Ayer Collection, Newberry Library, typewritten transcript).

48. Federal Land Office, Santa Fe, New Mexico. R101 (F176). This document has been published in 48 Cong., 2 sess., Hse. Ex. Doc. 62, p. 72 [Serial 1645].

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chronology . . . is that the Big Bead Mesa and vicinity were occupied by Navahos from 1745 (± 20) to 1812 (± 20)." A total of ninety-five hogan sites have been discovered in the vicinity of the mesa and adjacent canyon. "These little settlements are sufficiently numerous within an area of a few miles square, to indicate a rather remarkable concentration of Navaho population, provided, of course, that they were contemporaneous."[49]

The name for this early Navaho homesite is a Spanish word meaning onion. Describing the farming activities of the Acoma people who were visited by Espejo, he recorded that "We . . . found Castilian onions, which grow in the country by themselves, without planting or cultivation."[50] Some of the Pueblo folk and the Apaches used it for food.[51]

The term Casa Fuerte means a stronghold or fortified place. It could have been applied in a general way to the fortified mesa tops that the Navahos inhabited in the Province of Navaho and to the south. However, it was commonly used in the singular form and therefore implies a specific location. It may have been the term for the Cebolleta Mountain stronghold. It is also possible that the Spaniards saw the ruins of Pueblo Bonito in Chaco Canyon in the seventeenth century,[52]

49. D. L. Keur, "Big Bead Mesa, an Archeological Study of Navaho Acculturation, 1745-1812," *American Antiquity*, vol. 7, no. 2, pt. 2, p. 21 (Memoirs of the Society for American Archaeology, No. 1, October, 1941). But as Miss Keur points out, the evidence does not indicate the time of the *earliest* arrival of the Navahos. *Ibid.*, p. 2.

The author gives the exact location of the Mesa as T. 14N, R 4W; Long. 107 12', Lat. 35 28'.

50. Antonio Espejo, "Account of the Journey to the Provinces and Settlements of New Mexico, 1583," in H. E. Bolton, ed., *Spanish Exploration in the Southwest*, p. 183. New York: Charles Scribner's Sons, 1916.

51. Edward F. Castetter, *Ethnological Studies in the American Southwest*, p. 15. The University of New Mexico Bulletin, Whole number 266 (Biological Series, vol. 4, no. 1, 1935).

Cebolleta is a "diminutive of *cebolla* [onion] that correctly signifies the 'young onion' picked early for the table. The word was seldom used in this regard [in New Mexico], *cebollita* and *cebolla verde* being the most common terms." Fray Angelico Chavez, "Neo-Mexicanisms in New Mexico Place Names," *El Palacio*, vol. 57, no. 3 (March, 1950).

52. Juan Domínguez might have advanced much farther westward into Navaholand: "The early history of the region is vague and indefinite. No mention of it is made by chroniclers of the Spanish regime of New Mexico, although a name and the date 1661 are inscribed upon a wall of Inscription House, a prehistoric pueblo near Navajo Mountain." Ralph L. Beals, George W. Brainerd, and Watson Smith, *Archeological Studies in Northeast Arizona*, p. 1. Berkeley and Los Angeles: University of California

perhaps Juan Domínguez on one of his several campaigns against the Navahos. But there is no direct evidence at hand to prove this point. The term did not carry over into eighteenth century usage. *Los Penoles* or *castillejos* was a reasonable substitute unless, of course, Casa Fuerte was the specific term for the Chaco ruins.

In summary, the terms Piedra Lumbre, Province of Navaho, and Cebolleta acquired definite geographical meaning and location, evolving gradually as accepted terminology from the time of Espejo.

The Piedra Lumbre was a strategic site for entry into the Navaho country. At this junction point, travelers or soldiers could proceed northward and cross the Rio Chama at El Vado into the northeastern part of the Province; or they could turn southward up the valley of the Rio Puerco of the North and travel by easy gradient westward across the head waters of the Rio Gallina. From there the way was open to any part of the Navaho country. The Province of Navaho and Cebolleta were the main homesites of these people until the last half of the eighteenth century. Then under pressure from foes they spread westward into the mountainous region along the present-day Arizona and New Mexico state boundary. They retained a foothold in the Cebolleta region with difficulty until the American occupation of the Southwest in 1846 and their removal to a Pecos valley reservation in 1863-1864.

Press, 1945 (Univ. of Calif. Publications in American Archaeology and Ethnology, vol. 44, no. 1).

The "Trail leads into Navajo Canyon to the famous Inscription House Ruins, named from an almost illegible carving on the wall interpreted by some to read 'Carlos Arnais 1661' ". Harold S. Colton and Frank C. Baxter, *Days in the Painted Desert and the San Francisco Mountains: a Guide*. 2nd edition, p. 68 (Bulletin No. 2. Northern Arizona Society of Science and Art) Flagstaff, 1932.

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