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CHRONOLOGICAL RESUME OF SOME EARLY GEOLOGISTS IN THE ALBUQUERQUE COUNTRY

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To avoid much repetition, no bibliography is appended to this resume. The interested reader can find most of the sources by consulting the annual bibliographies compiled by the U. S. Geological Survey or the summary ones compiled by the New Mexico Bureau of Mines and Mineral Resources.

Prehistoric inhabitants of the area exploited minerals and rocks but left no record of "geologic" observations. The first recorded observations, beginning in 1540, are to be found in the chronicles and narratives of early Spanish expeditions. The Spaniards were particularly interested in gold, turquoise, copper, sulfur, and salt.

1807.—Lieut. Zebulon M. Pike made a few observations after he had been arrested and was being escorted to Santa Fe and southward to Mexico.

1828.—Placer gold discovered in Ortiz Mountains (Old Placers)—the first important discovery of gold west of the Mississippi River.

1833.—Gold-quartz veins discovered near the Old Placers.

1839.—New Placers discovered in San Pedro Mountains.

1841.—Thomas Falconer, a Fellow of the Geological Society of London, was arrested while a member of the Texan-Santa Fe expedition. His field notes and mineral collection were seized. Our first real geologist was off to a good start!

1844.—Josiah Gregg, most famous of all the early Santa Fe traders, wrote a chapter on the mines of New Mexico for his book, "Commerce of the Prairies." He noted gold mines, salt at Estancia, use of selenite for windowpanes, and the large petrified logs near Cerrillos (first mention of fossils?).

1846.—A notable year—geologic observations made by three men: Dr. F. A. Wislizenus, Lieut. W. H. Emory, and Lieut. J. W. Abert. The last-named saw the "immense petrified trees" near Cerrillos, and in the valley of the Rio Puerco he found "shark teeth, fish bones, fragments of large ammonites, and pieces of inoceramus." (The shark teeth were illustrated by lithograph.)

1849.—Lieut. J. H. Simpson found "beautiful specimens of petrified wood" near Cabezon; illustrated in color.

1853.—During the period 1853-1856 geologic reconnaissance for railroad routes across New Mexico was carried on by several geologists. Jules Marcou, a French-Swiss geologist, accompanied Lieut. A. W. Whipple on his exploration of the 35th parallel. Marcou's field notes in French, together with a translation by W. P. Blake (in parallel columns), were published in 1856. In 1858 Marcou published in Zurich his modestly entitled book, "Geology of North America," in which is a chapter, "Geology of New Mexico." He visited Pecos and Tijeras, collecting Pennsylvanian fossils which he described and illustrated. At Tijeras he collected the types of *Spirifer rockymontanus*. Then, on October 8, 1853, he wrote:

"I started with my friend Dr. John Bigelow, the botanist of the expedition, to ascend the highest peak* of the Sierra de Sandia *** The ascent of

one of the most elevated summits of the Rocky Mountains,—which after all is not a very easy matter, considering the wilderness, the difficulty of the roads and the fear of the Apache Indians—was effected by Dr. Bigelow and myself the 10th of October 1853. We chose the most elevated point of the Sierra de Sandia seen from Albuquerque, which attains the height of 12,000 feet above the level of the sea." (Heat waves may have introduced this error in their triangulation. Anyway it wasn't important in the selection of a route for the railroad!) Marcou prepared a colored geologic map of a strip across New Mexico.

1857.—Prof. John Strong Newberry accompanied Lieut. J. C. Ives in 1857-58 (published 1861) and Capt. J. N. Macomb in 1859 (not published until 1876).

1870.—Collections made during the 1870's by parties of the U. S. Geological Surveys West of the 100th Meridian under Lieut. G. M. Wheeler were studied by mineralogists and both invertebrate and vertebrate paleontologists.

1880.—Gen. U. S. Grant visited the New Placers district. Benjamin Silliman, Jr. was in New Mexico looking at gold placers.

1881.—Several prizes of \$100 each were offered at the Territorial Fair in Albuquerque, Oct. 3-8, for collections of minerals and ores. This year an attempt was made to pipe water from the Sandias to the New Placers.

1884.—Capt. Clarence E. Dutton, of the Ordnance Corps, was supposed to study the volcanics of the Cascade Range in 1884, but the topographic mapping had been delayed. Meanwhile, topographers mapping northwestern New Mexico had brought back such glowing accounts of the volcanic necks of the Rio Puerco valley that

"the Director was of the opinion that a single season could be spent with advantage in studying them. The Cascade business was therefore postponed for a year, and I was ordered to New Mexico to see what was there."

Thus Dutton came to New Mexico and that great classic, "Mount Taylor and the Zuni plateau,"¹ resulted from a single summer's work. I have not checked the weather records, but it must have been hot. "At the town of Albuquerque," Dutton saw "the Zandia Range, a large and rather imposing mountain ridge." He did not tarry long, however, because

"In the immediate valley of the Rio Grande the climate is temperate in winter and insufferable in summer; higher up the summers are temperate and the winters barely sufferable *** Even the sagebrush, the ashy bloom of the desert elsewhere, resents the

¹Dutton, C. E., 1885, U. S. Geol. Survey 6th Ann. Rept., p. 105-198, illus.



Air view of Cabezon Peak and other volcanic necks in the valley of the Rio Puerco.

Dick Kent Photography, Albuquerque.

scorching summer and refuses to stay, and the cacti, vengeful and repellant everywhere, here assume a still more cruel and misanthropic mien."

So Dutton hurried westward to the plateau country—the Zuni Plateau and Mount Taylor. His report contains an interesting disquisition on topographic terms borrowed from the Spanish.

"And by the way, what is a mesa? What is the special significance of this term? And why is it used instead of good Anglo-Saxon? I will answer these questions by asking another. Did it ever occur to the reader how poverty stricken the (I will not say English exactly, but) Anglo-American language is in sharp, crisp, definite topographic terms?

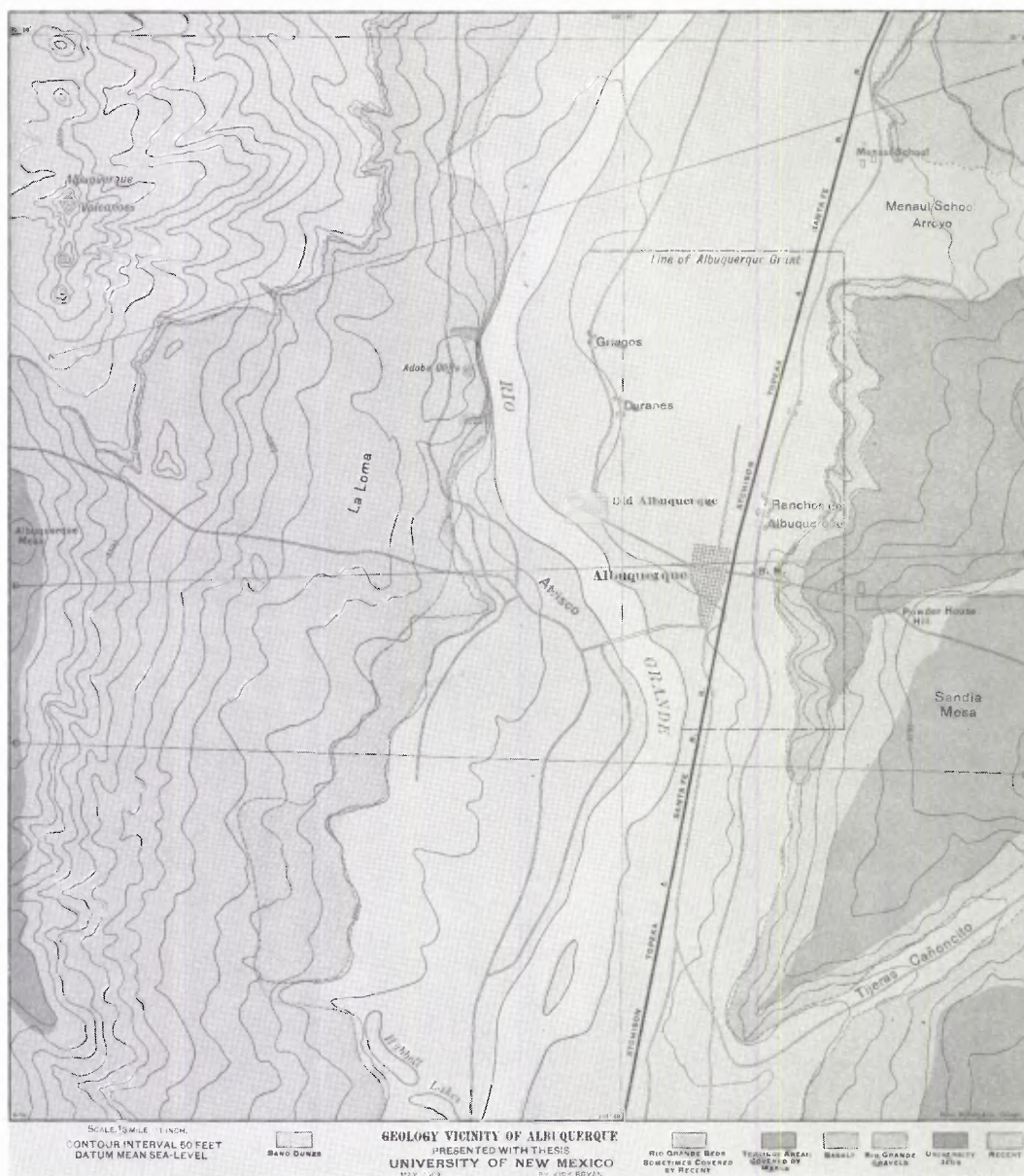
* * * But the Spanish—or Mexican, if you prefer—is rich in topographic terms which are delightfully expressive and definite. There is scarcely a feature of the land which repeats itself with similar characteristics that has not a pat name. And these terms are

euphonious as well as precise; they designate things objective as happily and concisely as the Saxon designates things subjective. Therefore we use them. There are no others adapted to the purpose."

He notes that it is not necessary that the high tabular surface should be completely encircled by a cliff to be called a mesa. Thus rock terraces, even sloping pediment surfaces, have come to be called mesas. (Many years ago I received an inquiry as to the definition of the term "arroyo." This correspondence led me to write a squib, "Terms from the Spanish," eventually published in *AMERICAN SPEECH*, v. 12, p. 79-81, 1937. In addition to mesa, arroyo, and canon [with tilde], other geomorphic terms from the Spanish include bajada, barranca, bolson, canada, ceja, cienega, cordillera, cuesta, playa, rincon, rio, and sierra.)

Dutton was far more interested in the volcanic necks and lava flows than in Mount Taylor, which he described as

"a large conical pile, planted upon a lofty



Copy (X $\frac{1}{2}$) of Kirk Bryan's (1909) geologic map of the Albuquerque area. Note how most of the city lay west of the railroad; the small rectangle northwest of Powder House Hill is the campus of the University of New Mexico.

The original map, printed in five colors by Rand, McNally & Co., Chicago, accompanied Bryan's paper, "Geology of the vicinity of Albuquerque," Univ. New Mexico Bull. 51, geol. ser., v. 3, no. 1, 24 p., 7 figs., map, 1909. Kirk Bryan was the second geology major to receive the B. A. degree from U. N. M. (1909). In those days a senior thesis was required. The paper deals with the Tertiary and Quaternary geology. Units discussed include the Rio Grande beds, Rio Grande gravels, University beds, Recent deposits, basalt, and the Albuquerque marl.

mesa. It has no neighbors of its own kith and kin*** Of Mount Taylor itself there is little to be said, and the description may be very brief. Its structure and composition have nothing of novelty.*** If the cone of Mount Taylor were all that this locality has to present for study it would hardly have repaid the trouble of a visit. But the volcanic

district of which it is the culminating point presents matter of great interest and instruction when viewed as a whole, for it discloses clearly the origin of the great lava caps which form such a conspicuous feature in many parts of the West, and offers a wide range of information concerning the modes of accumulation of lavas in the basic

group."

"If we stand upon the eastern brink of the Mount Taylor mesa we shall overlook the broad valley of the Puerco (East). The spectacle is a fine one and in some respects extraordinary. The edge of the mesa suddenly descends by a succession of ledges and slopes nearly 2,000 feet into the rugged and highly diversified valley-plain below. The country beneath is a medley of low cliffs or bluffs, showing the light browns and pale yellows of the lower and middle Cretaceous sandstones and shales. Out of this confused patchwork of bright colors rise several objects of remarkable aspect. They are apparently inaccessible eyries of black rock, and at a rough guess, by comparison with the known altitudes of surrounding objects, their heights above the mean level of the adjoining plain may range from 800 to 1,500 feet. The blackness of their shade may be exaggerated by contrast with the brilliant colors of the rocks and soil out of which they rise, but their forms are even more striking. *** These black rocks are technically called 'necks'."

Dutton describes a number of the larger necks and gives excellent illustrations, photographed on wood. Ironically, he was unable to visit the highest (2,000 feet) and most impressive, Cabezon. He wrote: "I had already been long away from my base of supplies and a tedious journey of nearly a hundred miles was necessary in order to reach it."

Another excellent account is Douglas Johnson's "Volcanic necks of the Mount Taylor region, New Mexico" (1907). And a generation later came C. B. Hunt's "Igneous geology and structure of the

Mount Taylor volcanic field, New Mexico" (1938). This seems to be the finest display of volcanic necks in the United States. Hunt thought that there might be about fifty of them, but Dutton (1885, p. 168) wrote that there are "scores *** and perhaps *** several hundreds of them. *** Thus nature has wonderfully dissected out for us the structure of these volcanoes and has dug away the earth from their roots. There is every gradation in the amount of exhumation and in the amount of destruction." Dutton's style is as unique as the necks about which he wrote. One can read what he wrote with pleasure.

1885.—Many geologists have lived and worked in the Albuquerque country since Dutton. Around the turn of the century, that most prolific writer, Charles Rollin Keyes, came to New Mexico and the New Mexico School of Mines; our stratigraphic nomenclature abounds with many names from his pen. Two of the early presidents of the University of New Mexico, Clarence Luther Herrick (first professor of geology and second president) and William George Tight, were geologists. Certain U. N. M. alumni later attained fame: Douglas Johnson, 1901; Kirk Bryan, 1909; Walter Frank Gouin, 1916; and John Walter Gruner, 1917. Johnson did the geology of the Cerrillos Hills for his Ph.D. at Columbia under Prof. Kemp (and Lobeck was Johnson's first graduate student).

Many readers may be surprised to learn that a national meeting of the Geological Society of America was held in Albuquerque in December 1907. Only 28 Fellows attended—the smallest national meeting since the one held at Columbus, Ohio in 1891, with only 23 attending. But at the first meeting of the Society, held at Ithaca, New York, 1888, the attendance was only 13.