New Mexico Geological Society

Downloaded from: https://nmgs.nmt.edu/publications/guidebooks/14



Baca Formation in the area around Socorro, New Mexico

Anonymous
1963, pp. 100-101. https://doi.org/10.56577/FFC-14.100

in:

Socorro Region, Kuellmer, F. J.; [ed.], New Mexico Geological Society 14 th Annual Fall Field Conference Guidebook, 204 p. https://doi.org/10.56577/FFC-14

This is one of many related papers that were included in the 1963 NMGS Fall Field Conference Guidebook.

Annual NMGS Fall Field Conference Guidebooks

Every fall since 1950, the New Mexico Geological Society (NMGS) has held an annual Fall Field Conference that explores some region of New Mexico (or surrounding states). Always well attended, these conferences provide a guidebook to participants. Besides detailed road logs, the guidebooks contain many well written, edited, and peer-reviewed geoscience papers. These books have set the national standard for geologic guidebooks and are an essential geologic reference for anyone working in or around New Mexico.

Free Downloads

NMGS has decided to make peer-reviewed papers from our Fall Field Conference guidebooks available for free download. This is in keeping with our mission of promoting interest, research, and cooperation regarding geology in New Mexico. However, guidebook sales represent a significant proportion of our operating budget. Therefore, only *research papers* are available for download. *Road logs*, *mini-papers*, and other selected content are available only in print for recent guidebooks.

Copyright Information

Publications of the New Mexico Geological Society, printed and electronic, are protected by the copyright laws of the United States. No material from the NMGS website, or printed and electronic publications, may be reprinted or redistributed without NMGS permission. Contact us for permission to reprint portions of any of our publications.

One printed copy of any materials from the NMGS website or our print and electronic publications may be made for individual use without our permission. Teachers and students may make unlimited copies for educational use. Any other use of these materials requires explicit permission.

This page is intentionally left blank to maintain order of facing pages.

BACA FORMATION IN THE AREA AROUND SOCORRO, N. M.

ANONYMOUS—II

It is hoped that the following notes on the Baca Formation will serve as a general introduction to this unit. The Baca has not been given the attention that it deserves, and knowledge concerning its distribution, thicknesses, and lithologic variations is inadequate.

HISTORY OF NOMENCLATURE

In 1910, Gardner, during a reconnaissance of the Carthage Coal Field southeast of Socorro, noted red beds and conglomeratic sandstones adjacent to the coal field. In addition, he collected vertebrate remains later identified by J. W. Gidley as *Palaeosyops*. Gidley also expressed the opinion that the containing rocks were Bridger (Eocene) in age.

In a report prepared by D. E. Winchester and published in 1920, the name *Datil Formation* was proposed for approximately 2000 feet of indurated volcanic tuff, rhyolite, cross-bedded sandstone, and conglomerate. These rocks crop out in the Datil Mountains of Socorro and Catron counties and are also known at a number of other places in Socorro County.

In 1946, Wilpolt and others published the results of their investigations of Joyita Hills, Los Piños Mountains, and the northern part of Chupadera Mesa. Red beds and conglomeratic sandstones in and adjacent to this area were observed and reported at a number of places in the Rio Grande trough. In the vicinity of the Carthage Coal Field, volcanic rocks underlain by red sandstone, shale, and conglomerate were also noted. The investigators correlated the sequence with the Datil Formation of Winchester but noted that the red sandstones, shales, and conglomerates in the basal part of the sequence contained *Palaeosyops* as earlier reported by Gardner. It was decided that the Datil should be divided into two formations, the older of which is Eocene in age and the younger Middle or Late Tertiary. They proposed the name *Baca Formation* for the Eocene unit and defined a type locality at Baca Canyon in the Bear Mountains, an eastern extension of the Datil Mountains. At the type locality, the Baca is 684 feet thick and consists of conglomerate, red and light gray sandstone, and red clay shale. The beds of conglomerate include pebbles and cobbles derived from pre-Cambrian and from Pennsylvanian and Permian strata.

DISTRIBUTION OF THE BACA FORMATION

The distribution of the Baca Formation in areas west of the Rio Grande valley is very inadequately known. It seems possible, however, that it may be quite extensive in the general area of the Mogollon Mountains and the volcanic plateaus to the north. Some observers are of the opinion that the Baca Formation extends into the western part of New Mexico along the general route of Highway 60, and one observer has tentatively reported it (oral communication) in extreme eastern Arizona.

On the east side of the Rio Grande valley the Baca is preserved in a narrow and discontinuous belt from a point east of the north end of Joyita Hills southward to the vicinity of Cerritos del Coyote. Farther south, there are only a few isolated exposures until a point is reached three miles north of U.S. Highway 380 where continuous exposures are encountered for a distance of between 7 and 8 miles along the east and south sides of the Carthage Coal Field. It is quite possible that there are additional exposures farther south; however, that area is geologically very poorly known at the present time.

The Baca at the type locality appears to rest conformably on sandstones of the Mesaverde Formation. Gardner reported 1000 feet of strata, later attributed to the Baca Formation by Wilpolt in the Carthage area. This is believed to be a very conservative figure; it is possible that the thickness may be as much as 2000 feet. In the Carthage area, the Baca locally rests on various Cretaceous rocks but elsewhere in the same area is in sedimentary contact with rocks as old as the Dockum Formation of Upper Triassic age. It is thus apparent that the Baca bevels the older formations and, undoubtedly at some points in its original distribution, beveled all the older sedimentary rocks in the area, since it contains conspicuous quantities of pebbles and cobbles derived from the pre-Cambrian.

POSSIBLE CORRELATIVE FORMATIONS

The Baca is one of several formations that occur in and adjacent to the Rio Grande valley that appear to be approximate correlatives. To the south, it seems very likely that the McRae Formation is an approximate correlative and documents part of the same chapter in geologic history as does the Baca.

To the north, in the vicinity of Albuquerque and from there to the Cerrillos Hills on the margin of the Santa Fe Plateau, the Galisteo crops out. It also is lithologically similar to the Baca Formation and is probably about the same age.

In the vicinity of Taos, an unnamed formation that greatly resembles the Baca lies immediately below the Picuris Tuff and rests disconformably on the Sangre de Cristo Formation.

Finally, red beds called by Smith the *El Rito Formation* in the southern part of the Brazos uplift appear to be generally correlative with the formations mentioned above.

AGE

The Baca has been determined to be Eocene on the basis of vertebrate remains collected by Gardner. With the exception of fossil wood, no further paleontologic information regarding the Baca has come to light. The woods, which have been identified as *Palmoxylon sp.* and *Leguminoxylon sp.*, support the Eocene age assignment but throw no further light on the matter.

Evidence from the apparently correlative McRae Formation is conflicting. According to Lee (1907) and Kelley and Silver (1952), the lower part of the McRae Formation has yielded triceratopsian dinosaur remains in the vicinity of Elephant Butte reservoir. By very arbitrary convention, strata containing dinosaurs, including *Triceratops*, are classified as pre-Cenozoic. In consequence, at least the lower part of the McRae may be older than the Baca. On the other hand, it is possible that the lowest part of the Baca is also Late Cretaceous in age. There is no paleontologic evidence regarding the Galisteo and its apparent correlatives farther north. The bases for the correlations are physical appearances and relationships.

SEDIMENTARY HISTORY

In central and northern New Mexico there are two suites of orogenic sediments. The earlier of these is the Baca and the later the Santa Fe Formation. The Santa Fe Formation is obviously the product of Middle and Late Tertiary mountain building, and this has long been recognized.

However, the fact that the Baca and correlative formations document earlier orogenic episodes has been largely overlooked prior to the last two decades. It is now clear that the Baca, McRae, Galisteo, El Rito, and correlative formations are suites of sediments deposited in basins adjacent to mountain ranges that were formed during very Early Tertiary and possibly Late Cretaceous times. The sediments suggest deposition in rapidly sinking basins inasmuch as, locally, some of the formations are at least 5000 feet thick. They also attest to deep erosion of the flanking uplifts since cobbles of Paleozoic limestone and pre-Cambrian granite and quartzite are present in abundance in some of the conglomerate beds. It is now apparent that some of the episodes of the Laramide orogeny involved areas at least as far south as central New Mexico and well beyond the region of the Rocky Mountains and adjacent plains, generally regarded as the limits of this period of mountain building.

REFERENCES

Gardner, James H. (1910) *The Carthage coal field, N. Mex.*, U.S. Geol. Surv., Bull. 381, p. 454.

Kelley, Vincent C., and Silver, Caswell (1952) *Geology of the Caballo Mountains*, Univ. N. Mex., Pub. geol. ser., n. 4, p. 115-120.

Lee, W. T. (1907b) *Note on the red beds of the Rio Grande region in central New Mexico*, Jour. Geol., v. 15, p. 52-58.

Wilpolt, R. H., MacAlpin, A. J., Bates, R. L., and Vorbe, Georges (1946) *Geologic map and stratigraphic sections of Paleozoic rocks of Joyita Hills, Los Piños Mountains, and Northern Chupadera Mesa, Valencia, Torrance, and Socorro counties, New Mexico*, U.S. Geol. Surv., Oil and Gas Inv. Map 61.

Winchester, D. E. (1920) *Geology of Alamosa Creek Valley, Socorro County, N. Mex., with special reference to the occurrence of oil and gas*, U.S. Geol. Surv., Bull. 716A.