Cretaceous rocks of the San Juan Basin area

Paul H. Umbach, 1950, pp. 82-84


This is one of many related papers that were included in the 1950 NMGS Fall Field Conference Guidebook.

Annual NMGS Fall Field Conference Guidebooks

Since 1950, the New Mexico Geological Society has held an annual Fall Field Conference that visits 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 papers. These books have set the national standard for geologic guidebooks and are an important reference for anyone working in or around New Mexico.

Free Downloads

The New Mexico Geological Society has decided to make our peer-reviewed Fall Field Conference guidebook papers available for free download. Non-members will have access to guidebook papers, but not from the last two years. Members will have access to all papers. 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 the societies' operating budget. Therefore, only research papers will be made available for download. Road logs, mini-papers, maps, stratigraphic charts, and other selected content will remain available only in the printed guidebooks. This will encourage researchers to purchase the printed guidebooks, which are essential references for geologic research in New Mexico and surrounding areas.

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 our website or printed and electronic publications may be reprinted or redistributed without our permission. Contact us for permission to reprint portions of any of our publications.

One printed copy of any materials from our 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 permission.
This page is intentionally left blank to maintain order of facing pages.
CRETACEOUS ROCKS
OF THE SAN JUAN BASIN AREA

By Paul H. Umbach
Stanolind Oil and Gas Company

The Cretaceous in the San Juan Basin consists mainly of interbedded sandstone and shale varying in general from approximately a 5,250-foot predominantly shale series in the northeastern portion to approximately a 4,000-foot predominantly sandstone series in the southwestern portion. The Cretaceous thickness over the San Juan Basin is relatively uniform, considering the rapid change in the type of sediments.

<table>
<thead>
<tr>
<th>DEFIANCE UPLIFT</th>
<th>SAN JUAN UPLIFT</th>
<th>NACIMIENTO UPLIFT</th>
<th>ZUNI UPLIFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEST</td>
<td>NORTH</td>
<td>EAST</td>
<td>SOUTH</td>
</tr>
<tr>
<td>Ojo Alamo</td>
<td>Animas/Ojo Alamo</td>
<td>Ojo Alamo</td>
<td>Ojo Alamo</td>
</tr>
<tr>
<td>McDermott</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kirtland</td>
<td>Kirtland</td>
<td>Kirtland</td>
<td>Kirtland</td>
</tr>
<tr>
<td>Fruitland</td>
<td>Fruitland</td>
<td>Fruitland</td>
<td>Fruitland</td>
</tr>
<tr>
<td>Pictured Cliffs</td>
<td>Pictured Cliffs</td>
<td>Pictured Cliffs</td>
<td>Pictured Cliffs</td>
</tr>
<tr>
<td>Lewis</td>
<td>Lewis</td>
<td>Lewis</td>
<td>Lewis</td>
</tr>
<tr>
<td>Cliff House</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Menefee</td>
<td>Menefee</td>
<td>Menefee</td>
<td>See Coal Reports for Detail</td>
</tr>
<tr>
<td>Point Lookout</td>
<td>Point Lookout</td>
<td>Point Lookout</td>
<td></td>
</tr>
<tr>
<td>Mancos</td>
<td>Mancos</td>
<td>Mancos</td>
<td>Mancos</td>
</tr>
<tr>
<td>Dakota</td>
<td>Dakota</td>
<td>Dakota</td>
<td>Dakota</td>
</tr>
</tbody>
</table>

CRETACEOUS FORMATIONS FLANKING THE MAJOR UPLIFTS IN THE SAN JUAN BASIN

The Dakota, with a thickness of 175-275 feet, varies from a fine-grained sandstone to a coarse conglomerate with intervening black shale and coal and is often divided into three zones commonly known as the upper, middle, and lower Dakota. Although these zones may be used in general as the upper, consisting of fine-grained sandstone, the middle, a shale and coal series, and the lower, a coarse conglomerate, such a division is difficult to correlate with any degree of accuracy.

The Graneros shale, 20-150 feet thick, consists of a black, dense, heavy, "poker chip" shale which can be correlated over the entire basin.

The overlying Greenhorn limestone, 50-100 feet thick, is recognized as a very calcareous shale over most of the central and northern portion of the San Juan Basin. The Mancos, with a thickness of 700-2,300 feet, thins and intertongues with the Mesaverde in the southern portion of the San Juan Basin. In the northeastern portion of the basin the Mancos consists of black, dense shale, which grades to a more silty shale in the southwestern portion.

Although the Carlile and Niobrara shale are recognizable in some areas, they are not in common use. Most geologists at the present time prefer to obtain more control to determine the value of these members as correlative markers.

The Mesaverde Group

The Mesaverde group consists of the Point Lookout, Menefee, and Cliff House formations, with the exception of the southern portion of the San Juan Basin, where the group is further subdivided as a result of coal studies made by the U. S. Geological Survey.
The Point Lookout sandstone, 150-200 feet thick, consists of a medium- to fine-grained sandstone which extends over the central and northern portion of the basin. In the southern portion of the basin this sandstone is underlain by tongues of sandstone interbedded with shale and coal which are considered to be in the Mesaverde group.

The Fruitland formation 0-500 feet thick, consists of coal, clay, shale, and sandstone of brackish and fresh water origin.

The Kirtland formation 0-1, 200 feet thick, contains green to gray shale with interbedded sandstone and is divided into an upper and a lower member.

The Menefee formation, 0-1, 600 feet thick, consisting of black shale, coal, and sandstone, is present in the northern three-fourths of the basin. In the southern portion the formation is subdivided into several coal members.

The Cliff House formation, 0-250 feet thick, contains medium- to fine-grained sandstone which thins northeastward in the San Juan Basin.

Overlying the Mesaverde is the Lewis formation, 150-2, 500 feet thick, a gray, silty shale with a few thin sandstone layers. This formation thickens to the east at the expense of the Mesaverde.

The Pictured Cliffs sandstone, 50-500 feet thick, contains interbedded shale and thin coal streaks within the massive white marine sandstone. This sandstone thickens northeastward at the expense of the overlying Fruitland formation.

The McDermott formation, 0-300 feet thick, is composed of brown to purple shale with a small amount of sandstone. This formation has its greatest thickness in the northwestern portion of the basin.

The Ojo Alamo sandstone, 0-200 feet thick, consists mainly of coarse sandstone and pebbles lying unconformably upon the Kirtland series. Although this contact has been reported as being conformable, sufficient evidence has been presented to prove that it is unconformable.

The Animas formation, 0-2, 000 feet thick, of late Cretaceous and Paleocene age, consists predominantly of arkosic sandstone and green to gray micaceous shale.
Selected References

Bauer, C. M. (1916) Contributions to the geology and paleontology of San Juan County, New Mexico; Pt. I, Stratigraphy of a part of the Chaco River Valley: U. S. Geol. Survey Prof. Paper 98-P.


Hunt, C. B. (1936) Geology and fuel resources of the southern part of the San Juan Basin, New Mexico; Pt. 2, the Mount Taylor coal field: U. S. Geol. Survey Bull. 860, pp. 31-80.


Reeside, J. D. (1934) Geology and fuel resources of the southern part of the San Juan Basin, New Mexico; Pt. 1, The coal field from Gallup eastward toward Mount Taylor: U. S. Geol. Survey Bull. 860, pp. 1-29.


