

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

Measured section of the Upper Cretaceous  
Mesaverde Formation and lower part of the  
lower Tertiary Wasatch Formation, Rifle  
Gap, Garfield County, Colorado

By

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Open-file Report 82-590

This report is preliminary and has not  
been reviewed for conformity with U.S.  
Geological Survey editorial standards  
(~~and stratigraphic nomenclature~~).

MEASURED SECTION OF THE UPPER CRETACEOUS MESAVERDE FORMATION  
AND LOWER PART OF THE LOWER TERTIARY WASATCH FORMATION,  
RIFLE GAP, GARFIELD COUNTY, COLORADO

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In the summer of 1978 a section was measured through the nearly vertical exposures of the Mesaverde Formation and lower part of the Wasatch Formation along the Grand Hogback at Rifle Gap on the eastern margin of the Piceance basin. The author was assisted by N. C. Dessenberger, M. P. Granica, and J. H. Whittke. The section starts approximately 50 feet above the Mancos-Mesaverde contact. The contact is below the level of Rifle Gap Reservoir and hence is not exposed. The top of the section is approximately the top of the Molina Member equivalent of the Wasatch Formation as defined by Donnell (1969, fig. 5). Nomenclature for the Mesaverde Formation is adapted from Warner (1964).

The lowest part of the Mesaverde Formation consists of the Corcoran and Cozette Members (Young, 1955), a heterogeneous unit consisting of marginal marine blanket sandstones, probably distributary channels, marine shales containing oyster beds, carbonaceous shale, and coal. Above the Corcoran-Cozette interval is a tongue of marine Mancos Shale about 270 feet thick. Overlying the marine tongue of the Mancos is the widespread marginal marine, regressive Rollins Sandstone Member. The Rollins or its equivalent Trout Creek Sandstone Member of the Iles Formation (Warner, 1964) are found throughout most of the Piceance basin. The Cameo-Fairfield coal zone is above the Rollins Member at Rifle Gap. Most of the coals have been clinkered. An unnamed marginal marine sandstone occurs above the Cameo-Fairfield coal zone. The sandstone is apparently found only along the southeastern margin of the basin. Above the unnamed sandstone is another clinkered coal zone about 450 feet thick. The remaining 3,000 feet of Mesaverde is thought to be largely fluvial. This part of the Mesaverde consists of a series of thick hogback-forming sandstone units containing such fluvial features as trough crossbeds, drift ripples, basal ripup zones, and large-scale lateral accretion. Intervals between the hogbacks are poorly exposed, and hence little is known about the lithologies present.

Fluvial Wasatch Formation unconformably overlies the Mesaverde. The well-developed paleoweathering profile found below the unconformity throughout much of the basin is locally absent at Rifle Gap (Hansley and Johnson, 1980). The Wasatch Formation is probably more than 5,000 feet thick in the vicinity of Rifle Gap (Donnell, 1961, p. 846). However, much of the unit is poorly exposed, and only the lower 1,550 feet was measured. The age of the Wasatch in the vicinity of Rifle Gap varies from Paleocene near the base (Gale, 1910) to middle early Eocene or late early Eocene near the top (Wood, 1962). Donnell (1969) subdivided the Wasatch into three members in the southwestern part of the basin and tentatively identified the members further to the east in the vicinity of Rifle Gap. Donnell's subdivisions are used in this report. The Atwell Gulch or oldest member consists of lenticular though crossbedded, conglomeratic sandstones and gray and maroon mudstone. The pebbles are dominantly dark volcanic and shallow intrusive rocks and minor varicolored cherts. A thin chert-pebble conglomerate found just above the unconformity was originally called the Ohio Creek Formation (Donnell, 1961) but was later found not to correlate with the type Ohio Creek (Johnson and May, 1980); hence, it is included in the Atwell Gulch in this report. Overlying the Atwell Gulch is the Molina Member. Unlike the Atwell Gulch, volcanic pebbles are not present in the sandstones. Pebbles consist of reworked sediments such as varicolored chert, quartzite, and limestone, possibly indicating a shift in source area. Molina sandstones are also more resistant and lighter colored than those in the underlying

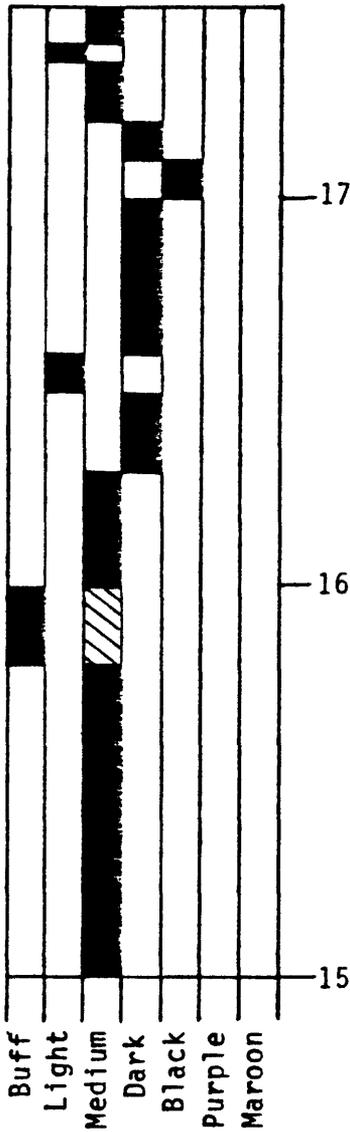
Atwell Gulch and form a series of resistant hogbacks (Donnell, 1969). The top of the measured section is the top of the Molina.

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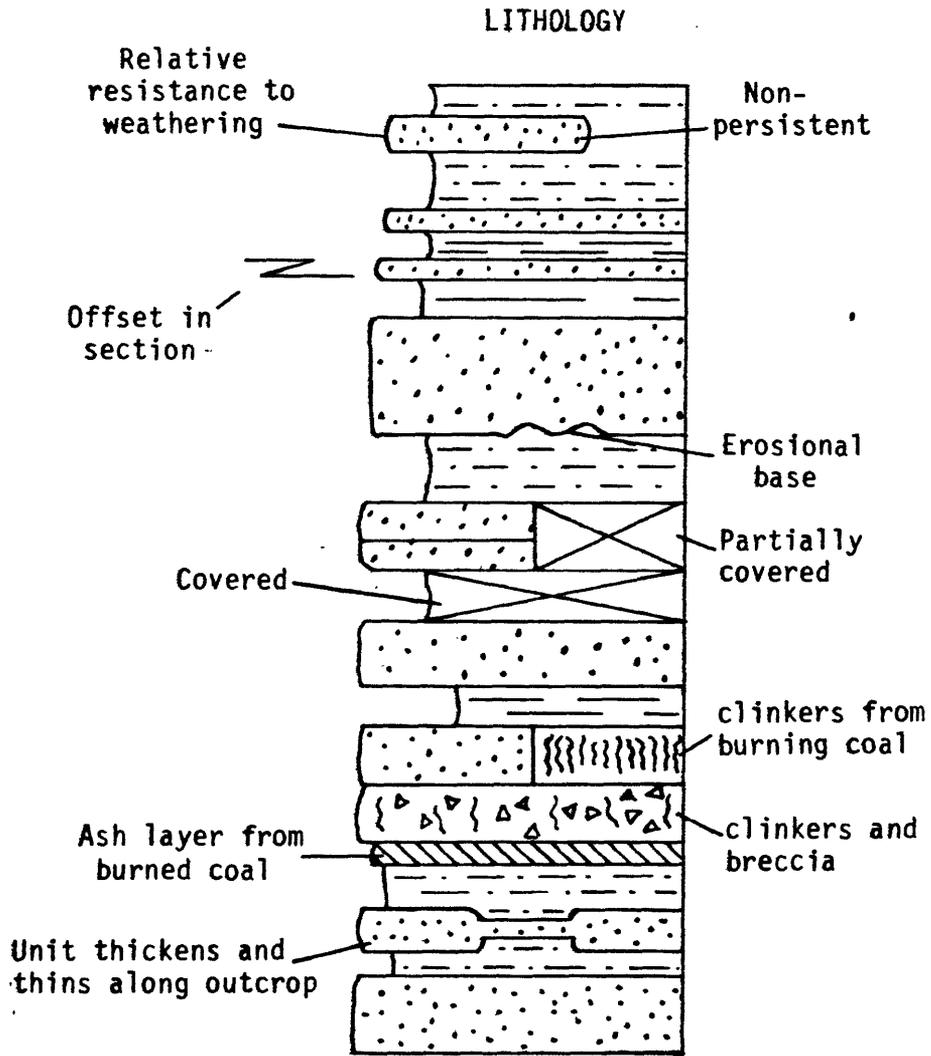


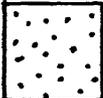
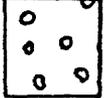
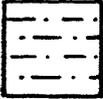
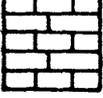
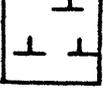
UNWEATHERED  
COLOR



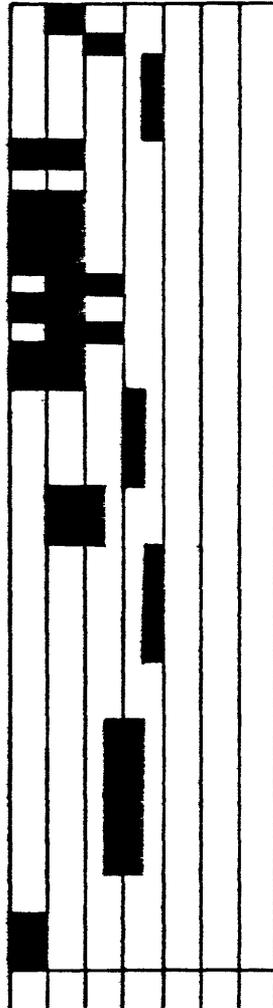
Thickness in  
hundreds of feet

Gray or  
green  
Hatched pattern  
indicates olive  
green



	Sandstone		Conglomeratic
	Siltstone		Carbonaceous or woody material
	Claystone or clay shale		Ripup clasts
	Limestone		Lateral accretion in sandstone
	Coal		Ripups oriented along accretion partings
	Calcareous or dolomitic		Claystone clasts cobble size

GRAIN  
SIZE  
RANGE



Clay to fine silt  
Medium to coarse silt  
Very fine sand  
Fine sand  
Medium sand  
Coarse sand  
Small pebbles

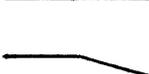
## PRIMARY BEDDING FEATURES

	Climbing ripples
	Symmetrical ripples
	Ripples nonspecific
	Medium scale crossbeds (.3-1 m)
	Small scale crossbeds (<.3 m)
	Subhorizontal laminae
	Parallel laminae, indistinct
	Parallel laminae, distinct
	Massive or indistinct laminae
	Lenticular beds
	irregular laminae

## OTHER FEATURES

- Ls. Limestone pebbles
- cht. Chert pebbles
-  Limestone concretion
-  Bedding features shown are cyclic
- Clink. Clinker
-  Gyp Gypsum veinlets
-  Ammonite
-  Gastropod
-  Bivalve
-  Fossil wood
-  Leaf
-  Root casts
-  Branching burrows
-  Oblique burrows
-  Horizontal burrows
-  Vertical burrows
-  Burrows nondescriptive
-  Contorted laminae
-  Dolomite concretion

### INTERNAL CHARACTERISTICS

Primary bedding features	Other features	general notes
		
		CaCO <sub>3</sub>
		
	λ	fissile
		
		Sharp top and base
	∇	
		
		

## LIST OF ABBREVIATIONS

abnd-abundant  
 bdg-bedding  
 bds-beds  
 biot-bioturbated  
 brn-brown  
 calc-calcareous  
 carb-carbonaceous  
 cgl-conglomerate  
 cht-chert  
 cly-claystone  
 conc-concretion  
 darks-biotite and other dark  
     colored minerals  
 dia-diameter  
 frags-fragments  
 gn-green  
 gy-gray  
 gyp-gypsum  
 hem-hematite  
 ig-igneous  
 interbed-interbedded  
 irreg-irregular  
 lam-laminated  
 lent-lenticular  
 mot-mottled  
 nods-nodules  
 olv-olive  
 oph-Ophiomorpha  
 org-organic  
 oyst-oysters  
 pbls-pebbles  
 persist-persistent  
 porc-porcelaneous  
 poss-possible  
 prob-probably  
 ptgs-partings  
 purp-purple  
 sh-shale  
 sl-slightly  
 sltst-siltstone  
 strigs-stringers  
 thk-thick  
 vns-veins  
 volc-volcanic