Stratigraphic correlation chart for western Colorado and northwestern New Mexico

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STRATIGRAPHIC CORRELATION CHART FOR WESTERN COLORADO AND NORTHWESTERN NEW MEXICO

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INTRODUCTION

The stratigraphic nomenclature applied in various parts of western Colorado, northwestern New Mexico, and a small part of east-central Utah is summarized in the accompanying chart (fig. 1). The locations of the areas, indicated by letters, are shown on the index map (fig. 2). Sources of information used in compiling the chart are shown by numbers in brackets beneath the headings for the columns. The numbers are keyed to references in an accompanying list. Ages where known are shown by numbers in parentheses in millions of years after the rock name or in parentheses on the line separating two chronostratigraphic units.

No Quaternary rocks nor small igneous bodies, such as dikes, have been included on this chart. Because space is limited, all the accepted formal stratigraphic-rank endings for each of the units are abbreviated (Cgl, Conglomerate; Dol, Dolomite; Fm, Formation; Gb, Gabbro; Gp, Group; Gn, Gneiss, Gr, Granite; Ls, Limestone; M, Member; Monz, Monzonite; Qtz, Quartz; Qtzite, Quartzite; Ss, Sandstone; Sh, Shale; T, Tongue). Other abbreviations used are Can for Canyon, Cr for Creek, and pt for part. Dashed lines where used as boundaries for stratigraphic units on the chart indicate that the upper and (or) lower time span is uncertain.

EXPLANATORY NOTES FOR COLUMNS

Col. A.-F.

The age of the Burro Canyon Formation is middle to late Early Cretaceous. The underlying Morrison Formation is considered to be of Late Jurassic age and the overlying Dakota Sandstone of Late Cretaceous age (cols. A-D). In northwestern Colorado (cols. E and F), the age of the Dakota is probably Late Cretaceous but it may also be Early Cretaceous.

Cols. A.-B.

The correlation of the Telluride Formation (or Conglomerate) and Blanco Basin Formation with the San Jose Formation is uncertain. All three are considered to be early Eocene age. The San Jose may be younger than the Telluride or Blanco Basin (Baltz, 1967, p. 56-57).

Col. A.

The Chuska Sandstone of Eocene(?) to early Oligocene age occurs on the west side of the San Juan basin (Hackman and Olson, 1°77).

The Middle Jurassic Cow Springs Sandstone is present beneath the Morrison Formation on the west side of the San Juan basin (Hackma-i and Olson, 1977).

Two older members of the Chinle are recognized beneath the Petrified Forest. These are the Shinarump (base) and the Monitor Butte (top). One younger member, the Owl Rock, is also present above the Petrified Forest. These three members are of more limited areal extent than the Petrified Forest (O'Sullivan, 1977).

De Chelly Sandstone (or De Chelly Sandstone Member of the Cutler Formation) of the west side of the basin is thought to correlate with the Glorieta Sandstone of the south side of the basin.

Cols. B.-C.

Age determinations on the Hinsdale Formation in parts of the volcanic field range from 4.7 to 23.4 m.y. on basalts and 4.8 to 22.4 m.y. on rhyolites (Lipman, 1975, p. 6, p. 90-100).

The early intermediate-composition volcanics and related rocks include several named units of limited areal extent, but of similar age and petrology—the West Elk Breccia at Powderhorn; the Conejos Formation in the vicinity of Conejos River canyon, southeastern part of the field; and the Lake Fork Formation in vicinity of Lake Fork of the Gunnison River, and the San Juan Formation near Telluride, both in the western part of the volcanic field. Still other names are applied to units in the northeastern part of the volcanic field (Lipman, 1975, p. 8).

Col. C.

The name Black Canyon Schist has been used in the Black Canyon of the Gunnison River, its type area, for Precambrian schists and gneisses but the stratigraphic and (or) lithologic significance of this name is questionable (Tweto, 1977; see also Hansen, this guidebook; Hedlund and Olson, this guidebook).

Col. D.

The Entrada Sandstone near Moab, Utah can be divided into the Moab Tongue (top), Slick Rock and Dewey Bridge Members (O'Sullivan, this guidebook).

Outliers of Page Sandstone have been recognized as far east as the Colorado River, near Moab, Utah (O'Sullivan, this guidebook).

In the deeper parts of the Paradox Basin, the Hermosa is considered by many to be a group divisible into the Honaker Trail (top), Paradox, and Pinkerton Trail (base) Formations (Wengerd and Matheny, 1958; Baars, 1962). The Paradox, the middle formation, has been separated into 29 evaporitic cycles (Hite and Cater, 1972). These cycles have been combined into five zones —the Ismay (top), Desert Creek, Akah, Barker Creek, and Alkali Gulch.

Col. E.

The members of the Green River Formation in the Piceance Basin are, successively downward, Parachute Creek (includes Mahogany oil-shale bed), Garden Gulch, Douglas Creek, and Anvil Points Members. Six tongues of the Green River, stratigraphically above the Parachute Creek, have also been mapped in the central and northern parts of the basin. These are, in sequence, youngest to oldest, the Stewart Gulch, Coughs Creek, Black Sulphur, Thirteenmile Creek, Dry Fork, and Yellow Creek (Hail, 1977; Duncan, and others, 1974; O'Sullivan, 1975).

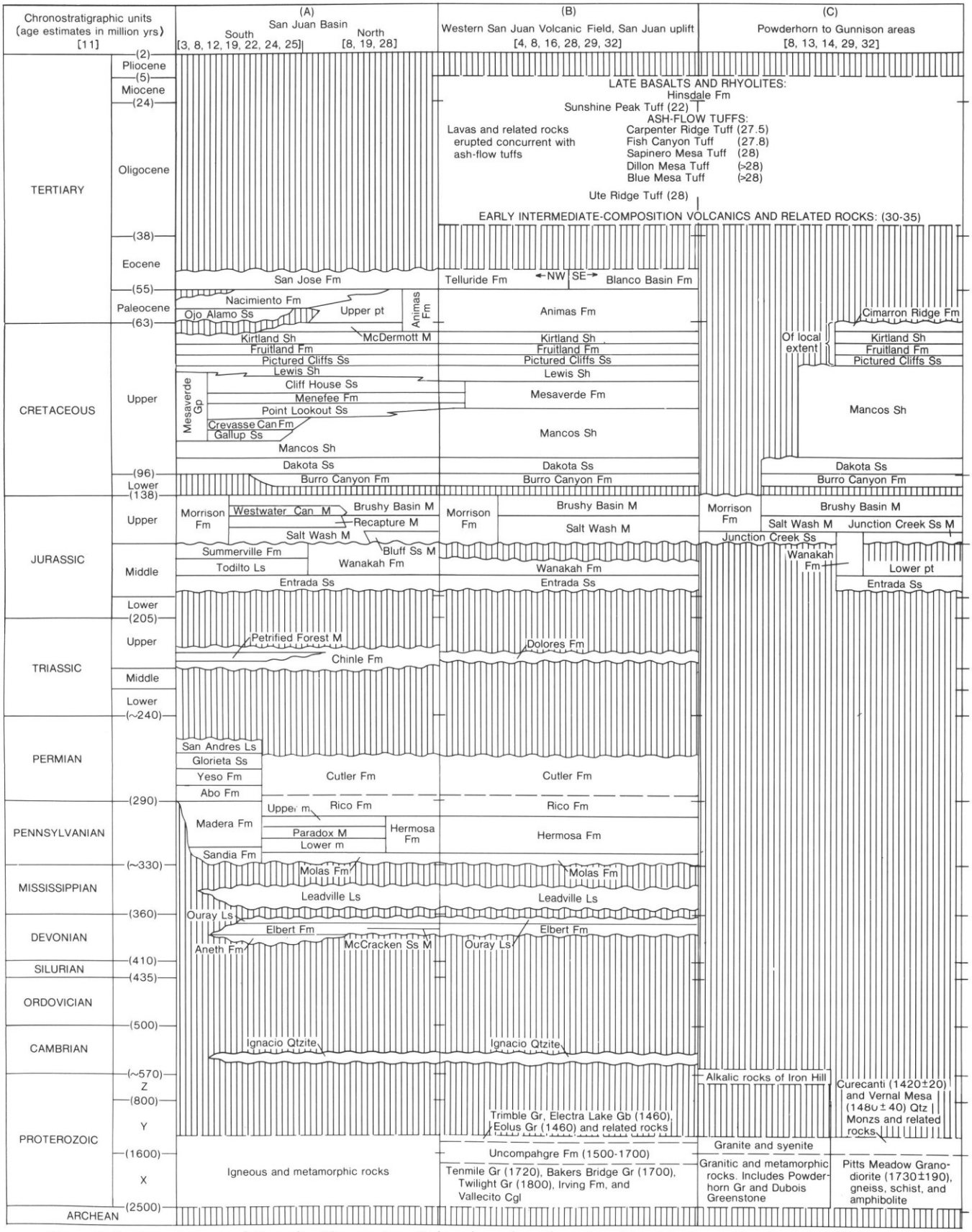
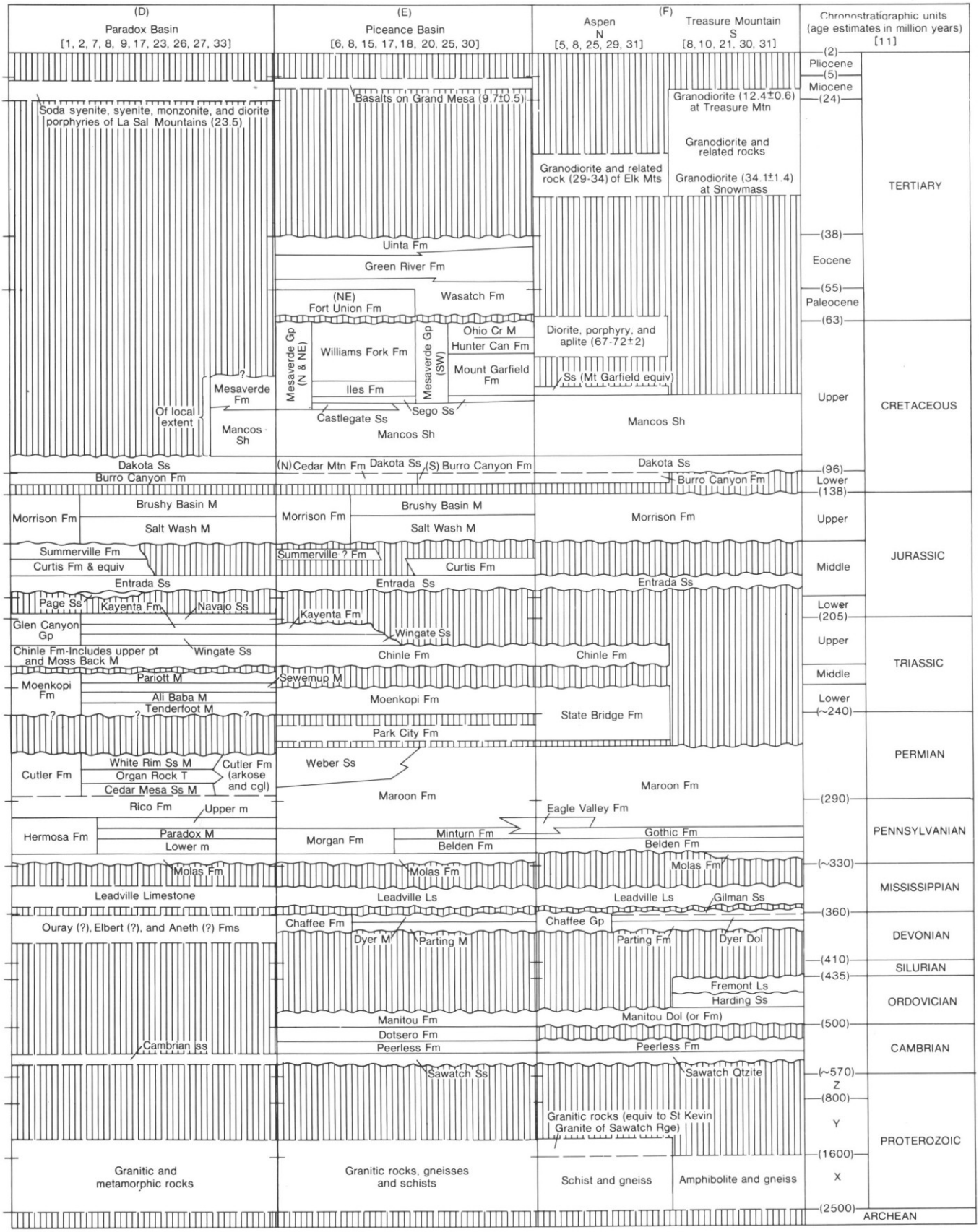


Figure 1. Stratigraphic correlation chart for western Colorado and northwestern New Mexico and east-central Utah.


(D)
Paradox Basin
[1, 2, 7, 8, 9, 17, 23, 26, 27, 33]
(E)
Piceance Basin
[6, 8, 15, 17, 18, 20, 25, 30]
(F)
Aspen
N
[5, 8, 25, 29, 31]
Treasure Mountain
S
[8, 10, 21, 30, 31]
Chronostratigraphic units
(age estimates in million years)
[11]
(2)
Pliocene
(5)
Miocene
(24)
Soda syenite, syenite, monzonite, and diorite porphyries of La Sal Mountains (23.5)
Basalts on Grand Mesa (9.7±0.5)
Granodiorite (12.4±0.6) at Treasure Mtn
Granodiorite and related rocks
Granodiorite and related rock (29-34) of Elk Mts
Granodiorite (34.1±1.4) at Snowmass
TERTIARY
(38)
Uinta Fm
Eocene
Green River Fm
(55)
Paleocene
(NE)
Fort Union Fm
Wasatch Fm
(63)
Mesaverde Gp (N & NE)
Williams Fork Fm
Ohio Cr M
Hunter Can Fm
Mount Garfield Fm
Mesaverde Gp (SW)
Diorite, porphyry, and aplite (67-72±2)
Ss (Mt Garfield equiv)
Iles Fm
Mesaverde Fm
Of local extent
Castlegate Ss
Sego Ss
Mancos Sh
Upper
CRETACEOUS
Dakota Ss
Burro Canyon Fm
(N) Cedar Mtn Fm
Dakota Ss
(S) Burro Canyon Fm
Dakota Ss
Burro Canyon Fm
(96)
Lower
(138)
Morrison Fm
Brushy Basin M
Salt Wash M
Morrison Fm
Brushy Basin M
Salt Wash M
Morrison Fm
Upper
Summerville Fm
Curtis Fm & equiv
Summerville ? Fm
Curtis Fm
Middle
JURASSIC
Entrada Ss
Entrada Ss
Entrada Ss
Page Ss
Kayenta Fm
Navajo Ss
Kayenta Fm
Lower
(205)
Glen Canyon Gp
Wingate Ss
Upper
Chinle Fm-Includes upper pt and Moss Back M
Wingate Ss
Chinle Fm
Chinle Fm
TRIASSIC
Middle
Moenkopi Fm
Pariott M
Sewemup M
Ali Baba M
Moenkopi Fm
Lower
Tenderfoot M
State Bridge Fm
(~240)
Park City Fm
PERMIAN
Cutler Fm
White Rim Ss M
Organ Rock T
Cedar Mesa Ss M
Cutler Fm (arkose and cgl)
Weber Ss
Maroon Fm
Maroon Fm
Rico Fm
Upper m
(290)
Eagle Valley Fm
Hermosa Fm
Paradox M
Lower m
Morgan Fm
Minturn Fm
Belden Fm
Gothic Fm
Belden Fm
PENNSYLVANIAN
Molas Fm
Molas Fm
Molas Fm
(~330)
MISSISSIPPIAN
Leadville Limestone
Leadville Ls
Leadville Ls
Gilman Ss
(360)
Ouray (?), Elbert (?), and Aneth (?) Fms
Chaffee Fm
Dyer M
Parting M
Chaffee Gp
Parting Fm
Dyer Dol
DEVONIAN
(410)
SILURIAN
(435)
Fremont Ls
Harding Ss
ORDOVICIAN
Manitou Fm
Manitou Dol (or Fm)
(500)
Cambrian ss
Dotsero Fm
Peerless Fm
Peerless Fm
CAMBRIAN
Sawatch Ss
Sawatch Qtzite
(~570)
Z
(800)
Granitic rocks (equiv to St Kevin Granite of Sawatch Rge)
Y
PROTEROZOIC
(1600)
Granitic and metamorphic rocks
Granitic rocks, gneisses and schists
Schist and gneiss
Amphibolite and gneiss
X
(2500)
ARCHEAN

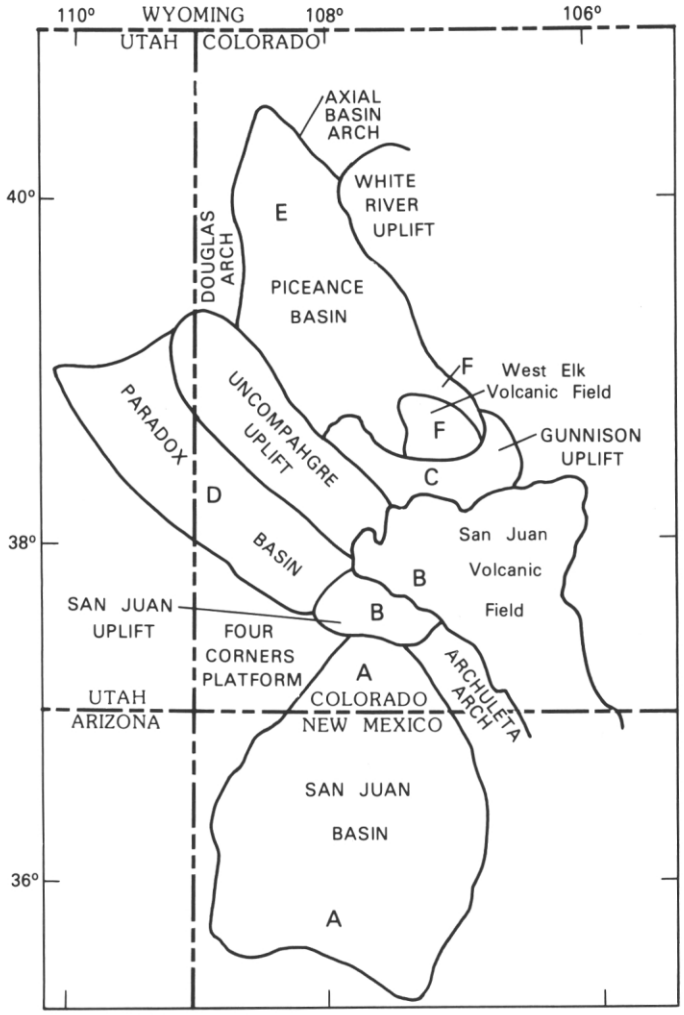


Figure 2. Index map showing areas referred to in stratigraphic columns and the tectonic provinces in western Colorado and northwestern New Mexico (from Grose, 1972, figure 1, p. 37).

In the southern part of the Piceance Basin, the Wasatch ha! been divided into the Shire (top), Molina, and Atwell gulcF Members (Donnell, 1969).

The Burro Canyon and Cedar Mountain Formations are con sidered to be correlatives. The type locality of the Burro Can yon is in San Miguel County, Colorado, and that formation name is used generally south and east of the Colorado River The type locality of the Cedar Mountain is in Emery County Utah and that formation name is used generally north and wes of the Colorado River.

The Ohio Creek is recognized as a white, kaolinitic unit 50 tc 150 m thick beneath the Tertiary-Cretaceous unconformity. It i! assigned as the upper member of the Hunter Canyon Forma tion, or, where the Mesaverde cannot be divided into forma tions, to the Mesaverde Formation (Johnson and May, 1980 Johnson and Keighin, this guidebook).

Col. F.

Basalt, tuff, breccia, and related igneous rocks of late Tertian) age are present west of Aspen.

Rocks called Summerville(?) in this column were mapped a! Summerville Formation by Lohman (1965) in the Grand Junc tion area. These rocks may belong in the lower part of the Morrison Formation instead. The Summerville is shown as having been truncated west of Moab by O'Sullivan (this guidebook).

Placement of the Mississippian boundary is uncertain. It may be within the Dyer Dolomite or within the Gilman Sandstone of the Chaffee Group (Tweto and Lovering, 1977).

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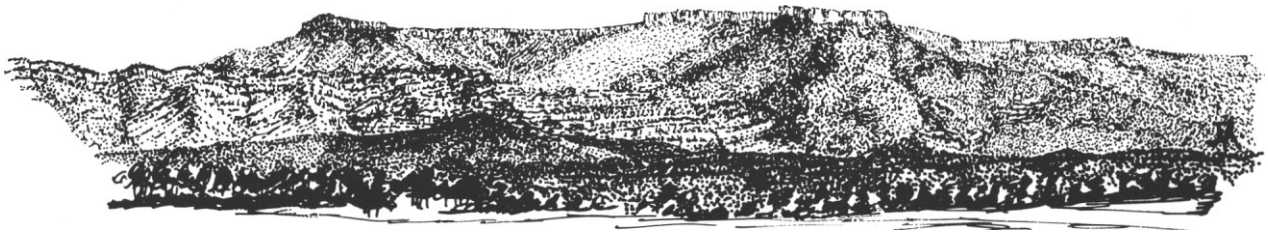

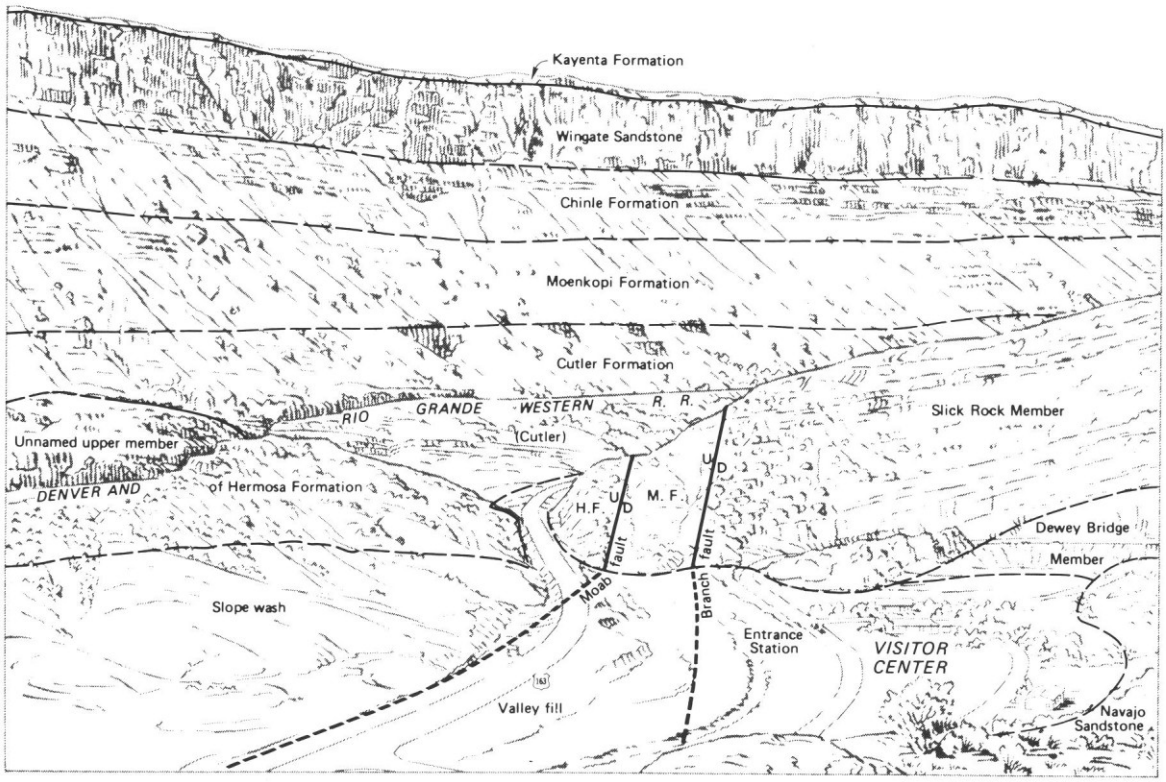

Faulted Seven Mile–Moab Valley anticline, viewed toward southwest from park road about 1.6 km above entrance to Arches National Park. U.S. Highway 163 at lower left is being renumbered U.S. 191. From color photograph by S. W. Lohman, U.S. Geological Survey, sketch by John R. Stacy shows geologic interpretation by Lohman and Edwin T. McKnight. **H.F.,** *unnamed upper member of Hermosa Formation;* **M.F.,** *Moenkopi Formation. Total vertical displacement along both faults is about 760 m. Original sequence of strata may be visualized by placing Navajo Sandstone (lower right) atop Kayenta Formation on skyline. The Pacific Northwest (gas) Pipeline is buried beneath the slice of the Moenkopi Formation between the two faults, which accounts for the disturbed appearance of the rock. The two faults unite just beyond low ridge of the Slick Rock Member.*