DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

GEOLOGIC QUADRANGLE MAP
MT. AXTELL QUADRANGLE, COLORADO
GQ–1604

EXPLANATION

Basaltic boulder colluvium

Granodiorite sills and dikes (d)

Sandstone

Conglomerate and conglomeratic sandstone

Shale

Sandy shale and siltstone

3.5 Coal bed
Thickness in feet (1 foot equals 0.3048 m)

Thin coal bed, seam, or lens

Carbonaceous or coaly shale

Interbedded sandstone, shale, and siltstone, undivided. Partly covered

Concealed by slope wash

h Thin limestone bed or lens

Limestone concretions

Clay pellets

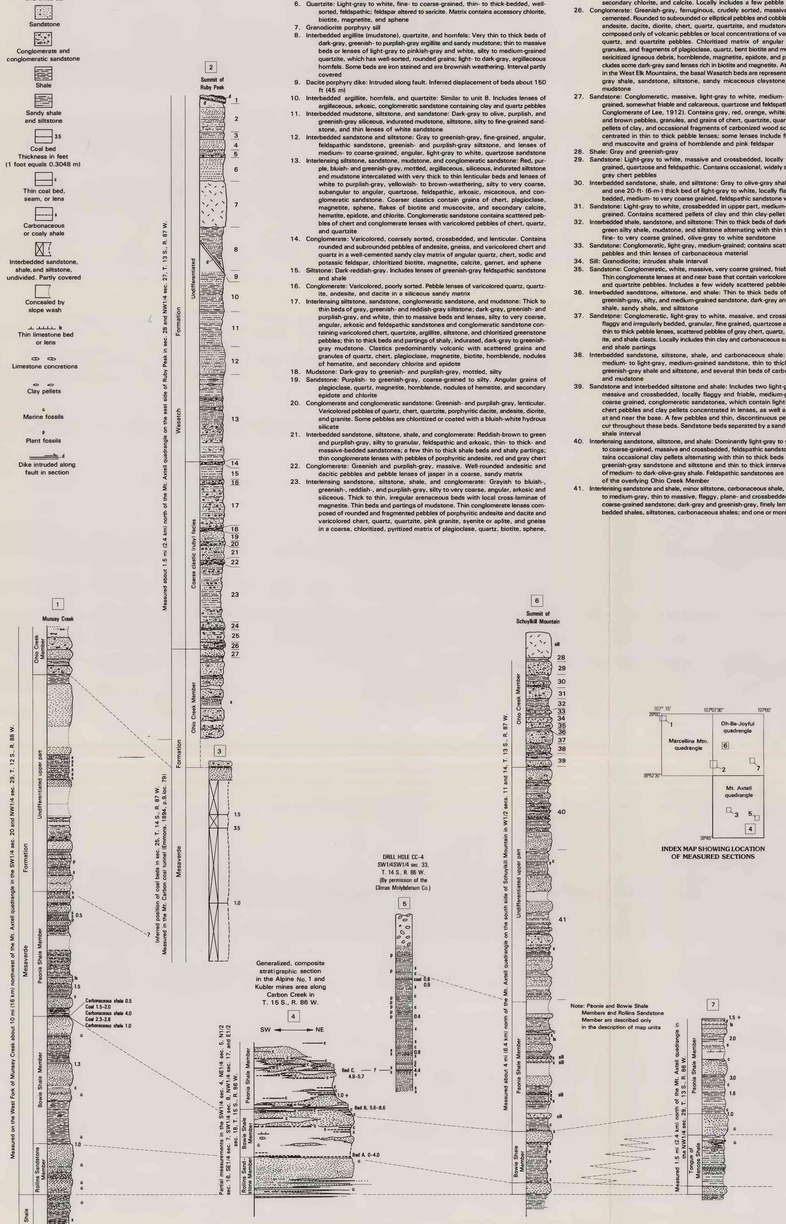
o Marine fossils

p Plant fossils

Dike intruded along fault in section

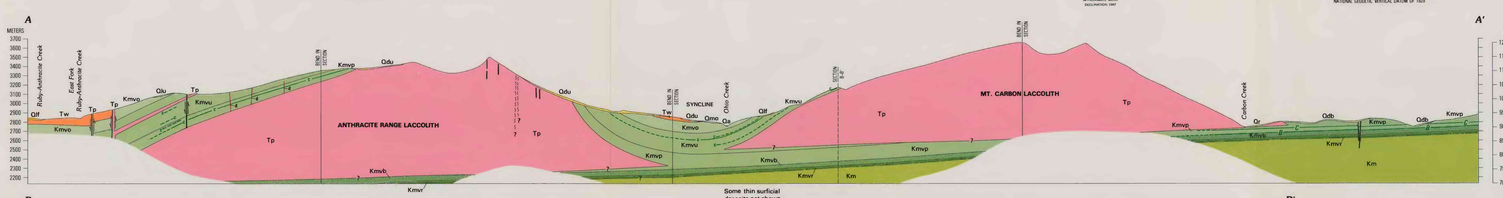
DESCRIPTION OF LITHOLOGIC UNITS[1]

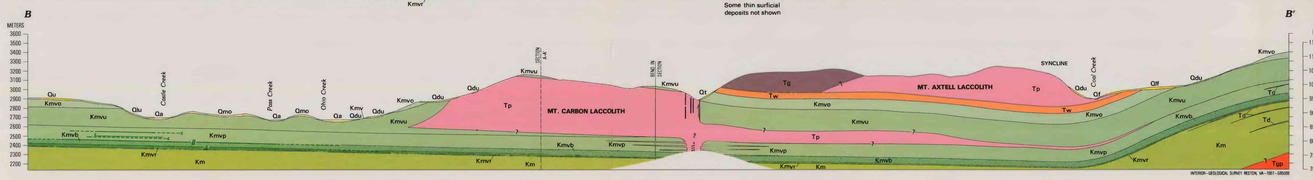
1. Quartzite: Greenish-gray, silty to medium-grained, arkosic. Intruded by granodioritic dikes and the Ruby Peak stock at the summit of Ruby Peak in the Marcellina Mountain quadrangle (Gaskill and Godwin, 1966)
2. Quartzite: Gray to white, coarse-grained to silty, thin- to thick-bedded, feldspathic
3. Hornfels (siltstone): Sandy, ferruginous
4. Quartzite: Greenish-gray to white, fine- to medium-grained, angular, thin- to thick-bedded, arkosic, pyritized
5. Hornfels (siltstone): Gray, sandy, ferruginous. One thick bed of intercalated, white, feldspathic quartzite containing white quartz pebbles
6. Quartzite: Light-gray to white, fine- to coarse-grained, thin- to thick-bedded, well-sorted, feldspathic; feldspar altered to sericite. Matrix contains accessory chlorite, biotite, magnetite, and sphene
7. Granodiorite porphyry sill
8. Interbedded argillite (mudstone), quartzite, and hornfels: Very thin to thick beds of dark-gray, greenish- to purplish-gray argillite and sandy mudstone; thin to massive beds or lenses of light-gray to pinkish-gray and white, silty to medium-grained quartzite, which has well-sorted, rounded grains; light- to dark-gray, argillaceous hornfels. Some beds are iron stained and are brownish weathering. Interval partly covered
9. Dacite porphyry dike: Intruded along fault. Inferred displacement of beds about 150 ft (45 m)
10. Interbedded argillite, hornfels, and quartzite: Similar to unit 8. Includes lenses of argillaceous, arkosic, conglomeratic sandstone containing clay and quartz pebbles
11. Interbedded mudstone, siltstone, and sandstone: Dark-gray to olive, purplish, and greenish-gray siliceous, indurated mudstone, siltstone, silty to fine-grained sandstone, and thin lenses of white sandstone
12. Interbedded sandstone and siltstone: Gray to greenish-gray, fine-grained, angular, feldspathic sandstone, greenish- and purplish-gray siltstone, and lenses of medium- to coarse-grained, angular, light-gray to white, quartzose sandstone
13. Interlensing siltstone, sandstone, mudstone, and conglomeratic sandstone: Red, purple, bluish- and greenish-gray, mottled, argillaceous, siliceous, indurated siltstone and mudstone intercalated with very thick to thin lenticular beds and lenses of white to purplish-gray, yellowish- to brown-weathering, silty to very coarse, subangular to angular, quartzose, feldspathic, arkosic, micaceous, and conglomeratic sandstone. Coarser clastics contain grains of chert, plagioclase, magnetite, sphene, flakes of biotite and muscovite, and secondary calcite, hematite, epidote, and chlorite. Conglomeratic sandstone contains scattered pebbles of chert and conglomerate lenses with varicolored pebbles of chert, quartz, and quartzite
14. Conglomerate: Varicolored, coarsely sorted, crossbedded, and lenticular. Contains rounded and subrounded pebbles of andesite, gneiss, and varicolored chert and quartz in a well-cemented sandy clay matrix of angular quartz, chert, sodic and potassic feldspar, chloritized biotite, magnetite, calcite, garnet, and sphene
15. Siltstone: Dark-reddish-gray. Includes lenses of greenish-gray feldspathic sandstone and shale
16. Conglomerate: Varicolored, poorly sorted. Pebble lenses of varicolored quartz, quartzite, andesite, and dacite in a siliceous sandy matrix
17. Interlensing siltstone, sandstone, conglomeratic sandstone, and mudstone: Thick to thin beds of gray, greenish- and reddish-gray siltstone; dark-gray, greenish- and purplish-gray, and white, thin to massive beds and lenses, silty to very coarse, angular, arkosic and feldspathic sandstones and conglomeratic sandstone containing varicolored chert, quartzite, argillite, siltstone, and chloritized greenstone pebbles; thin to thick beds and partings of shaly, indurated, dark-gray to greenish-gray mudstone. Clastics predominantly volcanic with scattered grains and granules of quartz, chert, plagioclase, magnetite, biotite, hornblende, nodules of hematite, and secondary chlorite and epidote
18. Mudstone: Dark-gray to greenish- and purplish-gray, mottled, silty
19. Sandstone: Purplish- to greenish-gray, coarse-grained to silty. Angular grains of plagioclase, quartz, magnetite, hornblende, nodules of hematite, and secondary epidote and chlorite
20. Conglomerate and conglomeratic sandstone: Greenish- and purplish-gray, lenticular. Varicolored pebbles of quartz, chert, quartzite, porphyritic dacite, andesite, diorite, and granite. Some pebbles are chloritized or coated with a bluish-white hydrous silicate
21. Interbedded sandstone, siltstone, shale, and conglomerate: Reddish-brown to green and purplish-gray, silty to granular, feldspathic and arkosic, thin- to thick- and massive-bedded sandstones; a few thin to thick shale beds and shaly partings; thin conglomerate lenses with pebbles of porphyritic andesite, red and gray chert
22. Conglomerate: Greenish and purplish-gray, massive. Well-rounded andesitic and dacitic pebbles and pebble lenses of jasper in a coarse, sandy matrix
23. Interlensing sandstone, siltstone, shale, and conglomerate: Grayish to bluish-, greenish-, reddish-, and purplish-gray, silty to very coarse, angular, arkosic and siliceous. Thick to thin, irregular arenaceous beds with local cross-laminae of magnetite. Thin beds and partings of mudstone. Thin conglomerate lenses composed of rounded and fragmented pebbles of porphyritic andesite and dacite and varicolored chert, quartz, quartzite, pink granite, and coarse-grained to silty, arkosic and feldspathic sandstone containing white quartz pebbles
24. Conglomerate: Greenish-gray, iron-stained, interlensing with conglomeratic and arkosic sandstone. Rounded and fragmented pebbles of andesite, dacite, diorite, chert, sandstone, and claystone
25. Sandstone, conglomeratic sandstone, and shaly siltstone: Reddish-brown, greenish- and bluish-gray, thick- to thin-bedded and crossbedded; silty to granular, arkosic. Andesitic clastics composed of plagioclase, quartz, biotite, magnetite, apatite, secondary chlorite, and calcite. Locally includes a few pebble lenses
26. Conglomerate: Greenish-gray, ferruginous, crudely sorted, massive, lensing, well cemented. Rounded to subrounded or elliptical pebbles and cobbles of porphyritic andesite, dacite, diorite, chert, quartz, quartzite, and mudstone; many lenses composed only of volcanic pebbles or local concentrations of varicolored chert, quartz, and quartzite pebbles. Chloritized matrix of angular coarse grains, granules, and fragments of plagioclase, quartz, bent biotite and muscovite flakes, sericitized ignneous debris, hornblende, magnetite, epidote, and pyrite; locally includes some dark-gray sand lenses rich in biotite and magnetite. At many localities in the West Elk Mountains, the basal Wasatch beds are represented by greenish-gray shale, sandstone, siltstone, sandy micaceous claystone, and siliceous mudstone
27. Sandstone: Conglomeratic, massive, light-gray to white, medium- to very coarse grained, somewhat friable and calcareous, quartzose and feldspathic. (Ohio Creek Conglomerate of Lee, 1912). Contains gray, red, orange, white, yellow, black, and brown pebbles, granules, and grains of chert, quartzite, quartz, and argillite, pellets of clay, and occasional fragments of carbonized wood scattered or concentrated in thin to thick pebble lenses; some lenses include flakes of biotite and muscovite and grains of hornblende and pink feldspar
28. Shale: Gray and greenish-gray
29. Sandstone: Light-gray to white, massive and crossbedded, locally flaggy, coarse-grained, quartzose and feldspathic. Contains occasional, widely scattered, small gray chert pebbles
30. Interbedded sandstone, shale, and siltstone: Gray to olive-gray shale and siltstone and one 20-ft- (6-m-) thick bed of light-gray to white, locally flaggy and cross-bedded, medium- to very coarse grained, feldspathic sandstone with clay pellets
31. Sandstone: Light-gray to white, crossbedded in upper part, medium- to very coarse grained. Contains scattered pellets of clay and thin clay-pellet lenses at base
32. Interbedded shale, sandstone, and siltstone: Thin to thick beds of dark-gray and olive-green silty shale, mudstone, and siltstone alternating with thin to thick beds of fine- to very coarse grained, olive-gray to white sandstone
33. Sandstone: Conglomeratic, light-gray, medium-grained; contains scattered gray chert pebbles and thin lenses of carbonaceous material
34. Sill: Granodiorite; intrudes shale interval
35. Sandstone: Conglomeratic, white, massive, very coarse grained, friable, feldspathic. Thin conglomerate lenses at and near base that contain varicolored chert, quartz, and quartzite pebbles. Includes a few widely scattered pebbles of gray chert
36. Interbedded sandstone, siltstone, and shale: Thin to thick beds of light- to dark-greenish-gray, silty, and medium-grained sandstone, dark-gray and greenish-gray shale, sandy shale, and siltstone
37. Sandstone: Conglomeratic, light-gray to white, massive, and crossbedded, locally flaggy and irregularly bedded, granular, fine grained, quartzose and feldspathic; thin to thick pebble lenses, scattered pebbles of gray chert, quartz, purplish quartzite, and shale clasts. Locally includes thin clay and carbonaceous sandstone lenses and shale partings
38. Interbedded sandstone, siltstone, shale, and carbonaceous shale: Thick beds of medium- to light-gray, medium-grained sandstone, thin to thick beds of dark, greenish-gray shale and siltstone, and several thin beds of carbonaceous shale and mudstone
39. Sandstone and interbedded siltstone and shale: Includes two light-gray and white, massive and crossbedded, locally flaggy and friable, medium-grained to very coarse grained, conglomeratic sandstones, which contain light- and dark-gray chert pebbles and clay pellets concentrated in lenses, as well as pebble layers at and near the base. A few pebbles and thin, discontinuous pebble lenses occur throughout these beds. Sandstone beds separated by a sandy siltstone-silty shale interval
40. Interlensing sandstone, siltstone, and shale: Dominantly light-gray to white, medium- to coarse-grained, massive and crossbedded, feldspathic sandstone, which contains accessional clay pellets alternating with thin to thick beds of light-gray to greenish-gray sandstone and siltstone and thin to thick intervals and partings of medium- to dark-olive-gray shale. Feldspathic sandstones are similar to those of the overlying Ohio Creek Member
41. Interlensing sandstone and shale, minor siltstone, carbonaceous shale, and coal: White to medium-gray, thin to massive, flaggy, plane- and crossbedded, silty, fine- to coarse-grained sandstone; dark-gray and greenish-gray, finely laminated to thick-bedded shales, siltstones, carbonaceous shales; and one or more thin coal beds

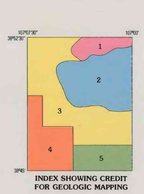


MEASURED STRATIGRAPHIC SECTIONS IN THE MT. AXTELL AND ADJOINING OH-BE-JOYFUL AND MARCELLINA MOUNTAIN QUADRANGLES, GUNNISON COUNTY, COLORADO

[1]Mutsey Creek, Ruby Peak and Schuylkill Mountain sections measured by J. R. Dyni, L. H. Godwin, and D. L. Gaskill







Glacial geology for the quadrangle by S. M. Colman and D. L. Gaskill

1. D. E. Ranta, M. W. Ganster, F. R. Dowsett, D. J. Baker, H. J. Stein, and D. M. Cochran, 1978; published by permission of Climax Molybdenum Company
2. J. E. DeLong, Jr., D. M. Cochran, C. H. Robinson, and Peter Barrows, 1978; published by permission of Climax Molybdenum Company. D. L. Gaskill, 1978–79
3. D. L. Gaskill, 1978–79. D. M. Cochran and C. H. Robinson, 1978; published by permission of Climax Molybdenum Company
4. D. L. Gaskill, B. L. Bartleson, F. E. Mutschler, and J. C. Kramer, 1976
5. D. L. Gaskill and E. C. Ashley, 1978–79

CORRELATION OF MAP UNITS

DESCRIPTION OF MAP UNITS

UNCONSOLIDATED SURFICAL DEPOSITS

Qa **Alluvial deposits (Holocene)**—Silt, sand, gravel, cobbles, and boulders in valley bottoms. Locally includes undifferentiated alluvial fan, glaciofluvial, and colluvial deposits, and peaty deposits in ponds and bogs

Qf **Debris and alluvial fan deposits (Holocene)**—Poorly sorted silt- to boulder-size material

Qs **Bog iron spring deposits (Holocene)**—Terraced spring and bog deposits of limonite. Includes glacial and colluvial deposits cemented by iron oxides

Qt **Talus (Holocene)**—Angular rock fragments forming talus cones, aprons, and scree slopes. Locally includes colluvial slope wash and fan deposits. Talus is gradational with boulder fields produced by frost wedging and periglacial creep on slopes of Mount Axtell, Carbon Peak, and elsewhere

Qr **Rock streams (Holocene and Pleistocene?)**—Relatively active, lobate deposits of angular rock fragments supporting little or no vegetation. Includes coexistensive talus, protalus, avalanche debris, and rock glaciers in cirque areas. Forms arcuate lobes, ridges, and levees. Gradational with felsenmeers and with vegetated debris slopes (Qd)

Qff **Landslide, slump, debris-flow, and earthflow complexes (Holocene and Pleistocene?)**—Forms arcuate lobes, ridges, marginal levees, and hummocky topography. Locally active. Qff (Twebb) is mostly volcanic debris derived from the Oligocene West Elk Breccia south and west of the quadrangle

Qfy **Landslide deposits, undifferentiated (Holocene and Pleistocene?)**—Derived from bedrock and (or) surficial material. Includes block slump, block glide, debris slide, rockfall, debris flow, slump, and earthflow deposits. Qdu (Kmvo) is conglomeratic sandstone debris derived from the Ohio Creek Member of the Mesaverde Formation

Qdb **Debris slopes mantled with bouldery basalt rubble and colluvium (Holocene and Pleistocene)**—Mostly derived from mass wasting of Miocene lava flows east of the quadrangle and from slope failure in surficial debris and shaly bedrock. Includes landslide, slump, earthflow, and solifluction deposits. Mantles Mesaverde and Mancos strata on relatively stable to unstable vegetated slopes. Forms a broad, locally active debris apron east of Carbon Peak

Qdu **Debris slopes, undifferentiated (Holocene and Pleistocene)**—Relatively inactive but potentially unstable deposits of angular rock fragments supporting herbaceous or forest cover. Mostly rock streams, talus, and colluvium. Locally includes slumps, landslides, debris and earthflows, till from landslides, and glacial deposits masked by coalesced rock streams in areas below cirques, such as on the northeast flank of Carbon Peak. Gradational with rock streams (Qr) and felsenmeer

Qu **Undifferentiated surficial deposits (Holocene and Pleistocene)**—Includes areas mantled with till (Qmo), debris flow, earthflow, colluvial, and solifluction deposits

Qmy **Younger glacial deposits (Pleistocene)**—Poorly sorted silt- to boulder-size till containing subangular and rounded clasts derived from local and distant sources. May include till from more than one glaciation but most was probably deposited during Pinedale glaciation. Often forms hummocky terrain. Locally includes glaciofluvial outwash and varved lake deposits

Qty **Younger terrace deposits (Pleistocene)**—Silt, sand, gravel, and cobbles. May include glaciofluvial outwash deposited during the Pinedale glaciation

Qmo **Older glacial deposits (Pleistocene)**—Clay- to boulder-size, unsorted deposits containing rounded clasts mostly derived from andesitic volcanic rocks of the Oligocene West Elk Breccia and acidic intrusive rocks west and southwest of the quadrangle. Probably deposited during the Bull Lake glaciation

Qto **Older terrace deposits (Pleistocene)**—Silt, sand, gravel, and cobbles. May include glaciofluvial outwash deposited during the Bull Lake glaciation

CONSOLIDATED ROCKS

Tgp **Granite porphyry (Miocene)**—Shown only in cross section *B-B'*. Inferred extension of stock underlying Mount Emmons in the adjoining Oh-Be-Joyful quadrangle (Dowsett and others, 1981)

Tp **Granodiorite porphyry and quartz monzonite porphyry (Oligocene)**—Ranges from granodiorite to quartz monzonite and quartz latite. Light-gray porphyritic rocks of variable texture and grain size. Contains phenocrysts of euhedral, commonly twinned, potassic feldspar as long as 2 in. (6 cm), quartz phenocrysts as much as 0.4 in. (1·10 mm) in diameter, and phenocrysts of plagioclase, hornblende, and biotite in a microcrystalline to medium-grained, granular matrix of alkali feldspar, plagioclase, quartz, biotite, and accessory amounts of apatite, zircon, sphene, and iron. Forms laccoliths, sills, and dikes

Tg **Granodiorite (Oligocene)**—Gradational with granodiorite porphyry (Tp) in the Mt. Axtell laccolith. Light gray to light greenish gray, porphyritic; contains small phenocrysts of plagioclase, hornblende, and biotite. Similar to granodiorite-quartz monzonite porphyries (Tp), but lacks the large potassium feldspar phenocrysts and smaller quartz phenocrysts. Forms southern part of the Mt. Axtell laccolith

Td **Dacitic dike and sills (Oligocene)**—Gray to greenish-gray porphyritic dike and sills that contain phenocrysts of plagioclase, hornblende, biotite, and, rarely, quartz in an aphanitic groundmass of plagioclase, potassium feldspar, and quartz. Similar dacitic and rhyodacitic dikes cut granodiorite and quartz monzonite dikes in the Oh-Be-Joyful quadrangle and volcanic rocks of the West Elk Breccia southwest of the quadrangle

Tw **Wasatch Formation (Eocene)**—Thin- to massive-bedded, very coarse grained to fine-grained, gray to white, bluish, greenish, purplish, and brownish to reddish-gray, feldspathic and arkosic sandstone, siltstone, mudstone, variegated conglomerate and conglomeratic sandstone that have complex interlensing relationships. The conglomerates are mostly rounded andesite and dacite pebbles in a coarse, angular grained, andesitic matrix, but include lenses and scattered pebbles of varicolored chert, quartz, quartzite, fragmented pebbles of mudstone and sandstone, and sparse pebbles of gneiss, aplite, and pink granite. Locally includes thin carbonaceous shale and beds of light-gray to white, feldspathic, conglomeratic sandstone like those in the underlying Ohio Creek Member of the Mesaverde Formation. The Wasatch sedimentary rocks in this area are a relatively near source, immature sequence of clastics. Lower part may be of Paleocene age. Maximum eroded thickness about 650 ft (198 m) in this quadrangle, but formation is more than 1700 ft (518 m) thick in the Oh-Be-Joyful quadrangle (Gaskill and others, 1967). Top eroded

Mesaverde Formation (Upper Cretaceous)

Kmvo **Ohio Creek Member**—Light-gray to white, medium- to very coarse grained, lenticular, generally massive, weakly crossbedded, friable, calcareous, feldspathic, kaolinitic, and conglomeratic channel sandstone; interbedded with coarse- to fine-grained sandstone, siltstone, shale, and minor carbonaceous shale. Rounded pebbles and granules of varicolored chert, quartzite, and quartz, silty-clay clasts, and, rarely, pebbles of volcanic composition form discontinuous lenses, pebble layers, and basal conglomerates in the conglomeratic beds. Small, commonly scattered pebbles of gray and black chert generally predominate. Some chert pebbles contain Paleozoic fossils. Some beds contain calcareous sandy concretions, shale nodules, carbonized and petrified wood fragments, and plant impressions. The base of the member is placed arbitrarily at the base of the lowest observed chert pebble sandstone. About 400 ft (122 m) thick. Top eroded. Previously called the Ohio Creek Formation (Gaskill and Godwin, 1966). Recent palynomorphic studies indicate these beds are Late Cretaceous in age and transitional with Mesaverde strata in the Piceance Creek Basin (Johnson and May, 1980)

Kmv **Main body**—Includes undifferentiated upper part, the Paonia Shale Member, and the Bowie Shale Member

Kmvu **Undifferentiated upper part**—Shown only in cross and columnar sections. Mostly interlensing, light-gray to white, medium- to coarse-grained, massive and cross-laminated, feldspathic sandstone which contains a few clay-pebble lenses; interbedded with thin to thick beds of light-gray and greenish-gray sandstone, siltstone, and dark-gray and olive-gray shale, carbonaceous shale, and a few, generally thin, coal beds. About 650–800 ft (198–244 m) thick

Kmvp **Paonia Shale Member**—Shown only in cross and columnar sections. White to gray, thin to thick-bedded, planar, crossbedded, fine- to coarse-grained, lenticular, fluvial sandstone interbedded with dark-gray and greenish-gray shale, siltstone, carbonaceous shale, a few thin limestone beds or lenses, and coal. Includes three or more, 4–8.6 ft (1.2–2.6 m) thick coal beds locally in the Ohio Creek coal district. Probably represents nonmarine, deltaic plain deposits. About 460 ft (140 m) thick

Kmvb **Bowie Shale Member**—Shown only in cross and columnar sections. Interbedded sandstone, siltstone, shale, carbonaceous shale, coal, and a few thin limestone lenses. Contains marine and brackish-water invertebrate fossils and one or more thin to thick coal beds. Transitional to the northeast with a marine tongue of the Mancos Shale. About 160 ft (49 m) thick in the southeastern part and as thick as 250 ft (76 m) in the northeastern part of the quadrangle. Includes a gray to white, massively bedded, feldspathic, marine(?) sandstone, 30–50 ft (9–15 m) thick at the top of the member that is equivalent to sandstone unit Kmvb in adjacent quadrangles (Gaskill and Godwin, 1966; Gaskill and others, 1967, 1986). Underlies coal bed B in the Ohio Creek coal district

Kmvr **Rollins Sandstone Member**—Gray to white, massive, cliff-forming, medium- to fine-grained quartzose sandstone. Locally includes interbedded siltstone and shale in lower part. Contains sparse littoral marine fossils. Overlain by coal bed A or carbonaceous shale in the Ohio Creek coal district. Ranges from about 30 ft (9 m) thick in drill holes near the Keystone mine to about 120 ft (36 m) in the Ohio Creek coal district. Equivalent to sandstone unit Kmva in adjacent quadrangles (Gaskill and Godwin, 1966; Gaskill and others, 1967, 1986)

Km **Mancos Shale (Upper Cretaceous)**—Littoral marine, light- to dark-gray, thin- to thick-bedded, fine-grained to silty, calcareous, locally shaly and carbonaceous sandstones interbedded with dark-gray shales and sandy shales at the top of the formation in transitional zone underlying the Mesaverde Formation. Mostly concealed by surficial deposits in this quadrangle. About 4,250 ft (1,296 m) thick

Coal bed or zone—Dashed where inferred. Thickness of coal, in feet, measured at triangle. Letters A, B, or C represent the three most productive coal horizons in the quadrangle. The A bed lies at the base of the Bowie Shale Member of the Mesaverde Formation; the B bed, or zone, lies at the base of the Paonia Shale Member of the Mesaverde Formation; and the C bed, or zone, is about 120 ft (36 m) stratigraphically above the B bed. Other, generally thin, coal beds are indicated by a small letter c

Contact—Approximately located

Fault—Dashed where approximately located; dotted where concealed. Bar and ball on downthrown side; number indicates estimated displacement in feet along fault. Arrow indicates direction and degree of dip

Mineralized fault—Dashed where inferred. Bar and ball on downthrown side. Shown only in inset map of the Forest Queen mine area

Syncline—Showing trace of axial plane and direction of plunge

Planar features
Strike and dip of beds

Trace of prominent joints

Igneous dike—Dikes underground in the Ruby-Anthracite coal mine

Dike or shear zone—Cuts Anthracite Range laccolith

Surface openings and explorations—Letter c indicates coal; u indicates radioactive mineralization

Adit—Dots represent reported length of main tunnel. Number indicates thickness of coal in feet. Unlettered adit indicates sulfide mineralization

Prospect—Unlettered prospect indicates sulfide mineralization

Shaft—Unlettered shaft indicates sulfide mineralization. TD is total depth in feet where known

Mine dump or tailing

Gravel pit

Drill hole—TD is total depth in feet where known

Approximate area of underground coal mine workings

Coal mine location—Number keyed to table 1 in pamphlet. Thickness of coal bed in feet

Metal mine, prospect, or mining claim location—Number keyed to table 2 in pamphlet

Erosional features

Tension scar or landslide scarp—Shown at head or along margin of landslide or slump

Generalized form patterns indicating mass movement of surficial debris forming arcuate lobes and ridges—Outlines margins of some debris-earthflow units

Spring—More are not mapped

Isolated patches or thin mantle of glacial drift—Locally covers areas not mapped as glacial deposits

Morainal ridges

Building—Shown only in inset map of the Forest Queen mine area

Unimproved road—Shown only in inset map of Forest Queen mine area

ECONOMIC GEOLOGY

More than 3,600,000 short tons of high volatile A, B, and C bituminous coal and about 143,000 short tons of anthracite and low volatile B bituminous coal have been mined in the quadrangle. Most of the coal was mined from coal beds A, B, and C in the Ohio Creek coal district and from the anthracite bed at Floresta (see columnar section, and table 1 in pamphlet). Indicated and inferred resources of coal in the lower part of the Mesaverde Formation underlie parts of the quadrangle, but most of the inferred coal is deeply buried or in areas intruded by igneous structures.

The northern area of the quadrangle includes part of the Ruby-Irwin (Mount Emmons) metalferous mining district. Mines in the area have produced silver, zinc, lead, copper, and gold sporadically since 1879 from quartz-arsenopyrite-pyrargyrite-proustite-calcite rhodochrosite-tetrahedrite-galena-argentite-pyrite-chalcopyrite-sphalerite veins (see table 2 in pamphlet). Only two metal mines in the quadrangle, the Forest Queen and the Keystone, have been important producers. The Keystone ranked third in silver production in Colorado for several years during the period from 1955 to 1964 (Colorado Division of Mines, 1886–1979). A major molybdenum deposit lies under Mount Emmons (Dowsett and others, 1981), about one-third of a mile north of the quadrangle boundary.

Thick deposits of sand and gravel are present along Ohio Creek and its major tributaries, and associated significant reservoirs of ground water may be present (Giles, 1980). No exploratory oil or gas wells have been drilled in the quadrangle, with the possible exception of an old drill site casing in the NW1/4 sec. 23, T. 13 S., R. 87 W. Prospects for the discovery of oil seem marginal due to widespread intrusion of igneous rocks. Oil potential is probably limited to possible traps in Cretaceous and Jurassic sedimentary rocks in the southern part of the quadrangle. Coal beds and sandstones in the Mesaverde Formation may have some potential as reservoirs for methane gas. Several prospects in uranium-bearing sandstone of the Wasatch Formation are located in the northwestern corner of the quadrangle (Goodknight, 1981).

Land-use activities should be avoided or moderated by engineering techniques on potentially unstable ground, such as construction on, or near, potentially unstable slopes, shale bedrock, landslide-earthflow deposits, or seemingly inactive, vegetated rock streams. Building should be avoided in hazardous areas, such as on debris fans, near known avalanche paths, in constricted valley bottoms subject to flooding, or in rockfall areas.

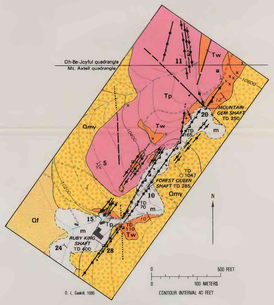


Figure 1.—Enlarged map of the Forest Queen mine area, in sections 2 and 3, T. 14 S., R. 87 W.

GEOLOGIC MAP OF THE MT. AXTELL QUADRANGLE, GUNNISON COUNTY, COLORADO

By
D. L. Gaskill, J. E. DeLong, Jr., and D. M. Cochran

1987

For sale by U.S. Geological Survey, Map Distribution, Box 25286, Federal Center, Denver, CO 80225.
Explanatory pamphlet accompanies map