DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

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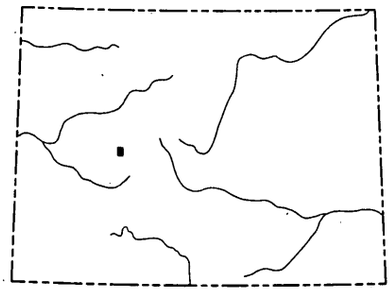
GEOLOGIC QUADRANGLE MAPS OF THE UNITED STATES

GEOLOGIC MAP OF THE OH-BE-JOYFUL QUADRANGLE GUNNISON COUNTY, COLORADO

By
David L. Gaskill, Larry H. Godwin, and
Felix E. Mutschler



QUADRANGLE LOCATION

152783
OME- 6640
Box 466

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1967

MAP GQ-578

Enclosed is the GQ-578 Map which should have been sent along with the McFarland and Hullinger application on the Keystone Property, Gunnison County, Colorado. I mailed it out yesterday and inadvertly left it out.

D. M. Hopper

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OME -6640

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

GEOLOGIC QUADRANGLE MAP
OH-BE-JOYFUL QUADRANGLE, COLORADO
GQ-578

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS

Qal Alluvial deposits—stream and pond deposits of silt, sand, gravel, and cobbles.

Qf Alluvial fans—includes alluvial cone deposits.

Qt Talus deposits—talus cones, aprons, and scree slopes.

Qr Rock glaciers—includes active and inactive rubble streams and attendant talus deposits.

Qu Surficial deposits, undifferentiated—includes slope-wash, talus, glacial, landslide, and bog deposits.

Ql **LANDSLIDE DEPOSITS**— landslide and slump blocks.

Qm **GLACIAL DEPOSITS**— ground moraine, morainal ridges, and dissected till remnants.

Qg **OUTWASH GRAVEL**— water-deposited glacial debris which forms terraces.

la **LAMPROPHYRE DIKES**— dark altered dikes rich in mica and amphibole. Cut quartz monzonite porphyry in Paradise stock area. Age relative to dacite porphyry dikes not known.

dp **DACITE PORPHYRY DIKES**— gray to green porphyritic dikes that contain phenocrysts of hornblende, plagioclase, and biotite in a microcrystalline matrix of plagioclase, quartz, alkalic feldspar, and augite. Cut quartz monzonite porphyry and granodiorite porphyry dikes in Ruby Range. Similar dikes cut Miocene(?) volcanic rocks southwest of map area.

a **APLITE AND ALASKITE DIKES**— pink to white dikes which cut Paradise stock. Aplite and pegmatite veinlets also cut Augusta stock but are not mapped.

f **FELSITE**— white to light-gray altered quartz and feldspar rock rich in pyrite. Ferromagnesian minerals leached. Forms small breccia plug and dike in Redwell Basin.

qm **QUARTZ MONZONITE**— light-gray fine- to medium-grained rock containing quartz, plagioclase, alkalic feldspar, biotite, and hornblende. Ranges in composition from quartz diorite to quartz monzonite. Gradational into quartz monzonite porphyry. Forms Paradise stock and part of Augusta stock.

qmp **QUARTZ MONZONITE PORPHYRY**— light-gray porphyritic rock that contains large orthoclase and quartz phenocrysts and smaller plagioclase, biotite, and hornblende phenocrysts in a microcrystalline to fine-grained matrix of quartz and alkalic feldspar. Includes rocks intermediate in composition between quartz monzonite porphyry and granodiorite porphyry. Forms dikes, sills, laccoliths, and stocks.

wqp **WHITE QUARTZ PORPHYRY DIKES**— white dense porphyritic dikes with euhedral phenocrysts of quartz and altered feldspar in a sericitized groundmass. Probably equivalent to granite porphyry of Treasure Mountain dome. Cuts granodiorite porphyry and is cut by quartz monzonite of Augusta stock.

g **BIOTITE GRANODIORITE**— medium- to fine-grained granular rock that contains plagioclase, quartz, alkalic feldspar, biotite, hornblende, and small pyroxene crystals. Ranges in composition from quartz diorite to granodiorite. Forms early border phase of Mount Owen and Augusta stocks and dikes. Cut by other igneous rocks.

gp **GRANODIORITE PORPHYRY**— light-gray porphyritic rock that contains zoned plagioclase, hornblende, and biotite phenocrysts in a microcrystalline matrix of quartz, plagioclase, and alkalic feldspar. Forms dikes and sills. Includes altered and chloritized dikes and sills adjacent to the stocks of the Ruby Range.

Tw **WASATCH FORMATION** (about 1,700 ft; top eroded)—varicolored fine- to very coarse-grained lenticular and evenly bedded sandstone, siltstone, and mudstone; thick lenses of conglomerate and conglomeratic feldspathic sandstone in basal part. Generally metamorphosed to quartzite, argillite, and silty and argillaceous hornfels. Conglomerates are well cemented and are mainly andesitic, dacitic, gneissic, and granitic pebbles in very coarse angular argillaceous matrix, but include lenses of varicolored chert, quartz, quartzite, and fragmented mudstone pebbles. Lower part of formation may be Paleocene in age.

Toc **OHIO CREEK FORMATION** (about 400 ft)—upper part: light-gray to white friable medium-grained feldspathic conglomeratic sandstone. Pebbles are mainly chert, quartzite, and quartz, but a few igneous rock pebbles were found. Middle part: interbedded sandstone, siltstone, shale, and carbonaceous shale. Basal part: very thick and massive beds of light-gray to white feldspathic sandstone that locally contains pebble lenses and scattered pebbles like those in the upper unit; includes subordinate interbeds of sandy siltstone, silty shale, and carbonaceous shale.

Kmv **MESAVERDE FORMATION** (1,600 to 1,800 ft)—interbedded sandstone, shale, coal, and carbonaceous shale.

Kmvb Second sandstone unit (50–100 ft)—medium-gray to white thick-bedded massive fine- to medium-grained sandstone separated from basal sandstone unit (Kmva) by about 200 feet of dark-gray marine shale.

Kmva Basal sandstone unit (12–50 ft)—medium-gray to white generally thick-bedded and massive fine- to very fine-grained sandstone. Intertongues with upper member of Mancos Shale. Probably equivalent to Rollins Sandstone Member of Mesaverde Formation at type locality.

MANCOS SHALE (about 4,400 ft):

Kmu Upper member (about 4,100 ft)—mainly dark-gray laminated well-indurated silty marine shale. Contains interbeds of silty sandstone, sandy limestone, and carbonaceous shale in transition zone immediately below the Mesaverde Formation. Lower 700 feet is gray calcareous shale of Niobrara age. Locally metamorphosed to hornfels.

Kmf Fort Hays Limestone Member (80 ft)—dark-gray very thin- to thick-bedded dense fossiliferous limestone, shaly limestone, and limy shale.

Kml Lower member (about 230 ft)—grayish-black siliceous indurated shale, sandy shale, and fine-grained quartzitic sandstone.

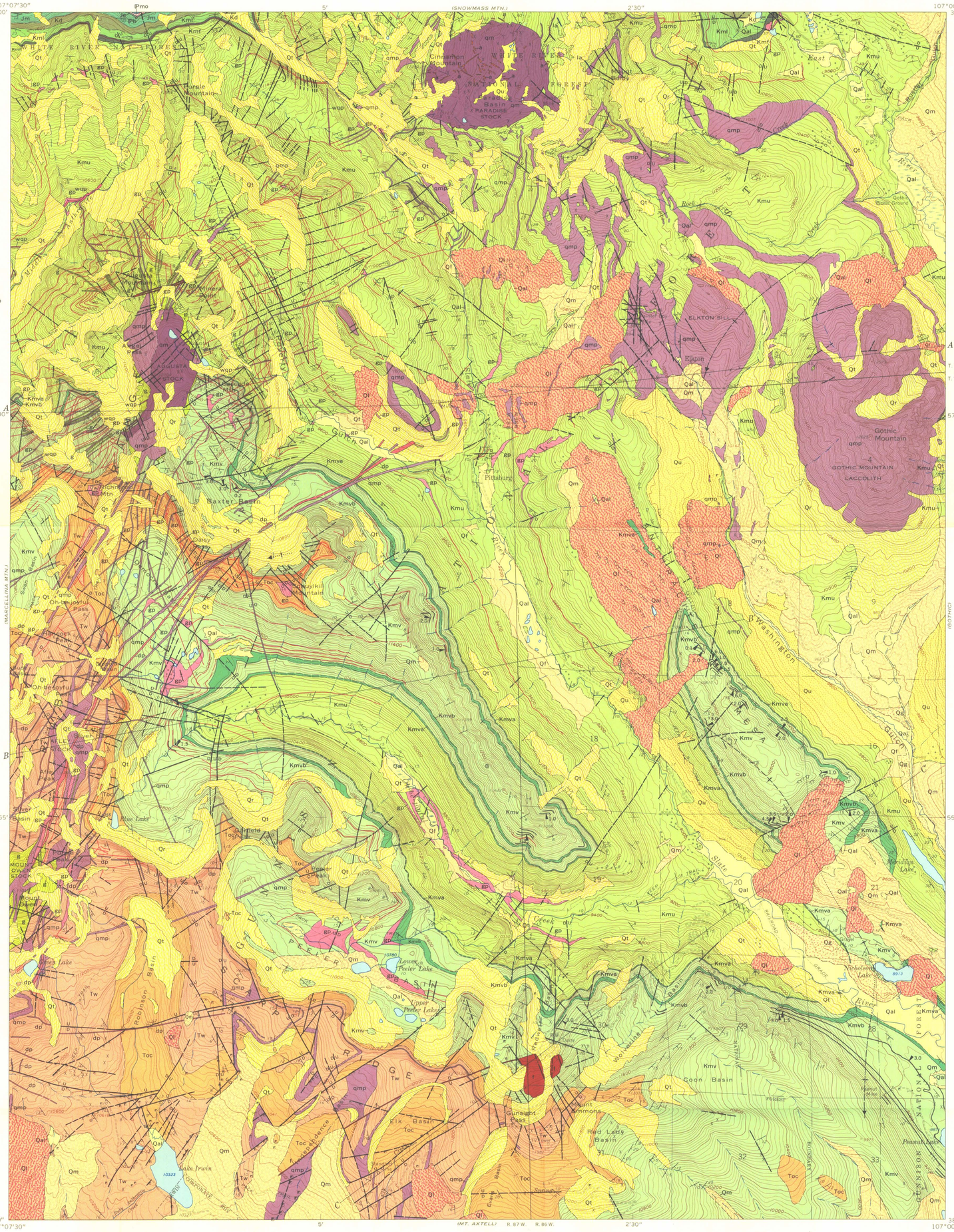
Kd **DAKOTA SANDSTONE** (about 215 ft)—gray to white thin- to very thick-bedded medium- to fine-grained quartzite; contains thin beds of dark silty shale metamorphosed to hornfels.

Jm **MORRISON FORMATION** (about 350 ft)—mainly varicolored thin-bedded mudstone, siltstone, shale, and marlstone. Includes white to gray fine- to medium-grained sandstone and thin lenticular beds of medium-gray limestone and sandy limestone near base. Beds metamorphosed to hornfels, quartzite, and marble.

Je **ENTRADA SANDSTONE** (about 30 ft)—light-gray to white fine-grained thick-bedded quartzite that contains scattered very coarse grains and granules and a few shale partings. Angular unconformity at base.

IPb **BELDEN FORMATION** (0–100 ft, top eroded)—light- to dark-gray sandy cherty limestone, dolomitic limestone, and dolomite interbedded with gray to greenish-gray sandy siltstone and sandstone. Metamorphosed to marble, hornfels, and quartzite.

IPmo **MOLAS FORMATION** (about 50 ft)—dark-green, reddish-gray, and black argillite, argillaceous siltstone, and sandstone. Variegated nodules, pebbles, and fragments of chert and quartzite at base. Deposited on karst surface of Upper and Lower Mississippian Leadville Limestone. Metamorphosed to hornfels and quartzite. Thickness variable.



EXPLANATION

QUATERNARY

Recent

Qal, Qf, Qt, Qr, Qu — Surficial deposits
Qal, *alluvium*
Qf, *fan deposits*
Qt, *talus deposits*
Qr, *rock glaciers*
Qu, *surficial deposits, undifferentiated*

Pleistocene and Recent

Ql — Landslide deposits

Pleistocene

Qm — Glacial deposits
Circles indicate isolated patches of glacial deposits

Qg — Outwash gravel

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TERTIARY

Upper Eocene(?) and younger — Probably younger than Green River Formation

la — Lamprophyre dikes
dp — Dacite porphyry dikes
a — Aplite and alaskite dikes
f — Felsite
qm — Quartz monzonite
qmp — Quartz monzonite porphyry
wqp — White quartz porphyry dikes
g — Biotite granodiorite
gp — Granodiorite porphyry

Eocene

Tw — Wasatch Formation

Paleocene

Toc — Ohio Creek Formation

CRETACEOUS

Upper Cretaceous

Kmv, Kmvb, Kmva — Mesaverde Formation
Kmvb, *second sandstone unit*
Kmva, *basal sandstone unit*

Kmu, Kmf, Kml — Mancos Shale
Kmu, *upper member; dots indicate base of prominent sandstone beds*
Kmf, *Fort Hays Limestone Member*
Kml, *lower member*

Lower and Upper Cretaceous

Kd — Dakota Sandstone

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JURASSIC

Upper Jurassic

Jm — Morrison Formation

Je — Entrada Sandstone

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PENNSYLVANIAN, CARBONIFEROUS

IPb — Belden Formation

IPmo — Molas Formation

2.0 — Coal bed
Thickness of coal, in feet, measured at triangle

Contact
Dashed where approximately located; short dashed where inferred

U D — Fault or shear zone
Dashed where inferred. U, upthrown side; D, downthrown side. Faults not shown under surficial cover

Anticline
Showing crestline, approximately located; dotted where concealed

Syncline
Showing troughline and direction of plunge; dashed where approximately located; dotted where concealed

15 — Strike and dip of beds

Horizontal beds

Slump and landslide scarps

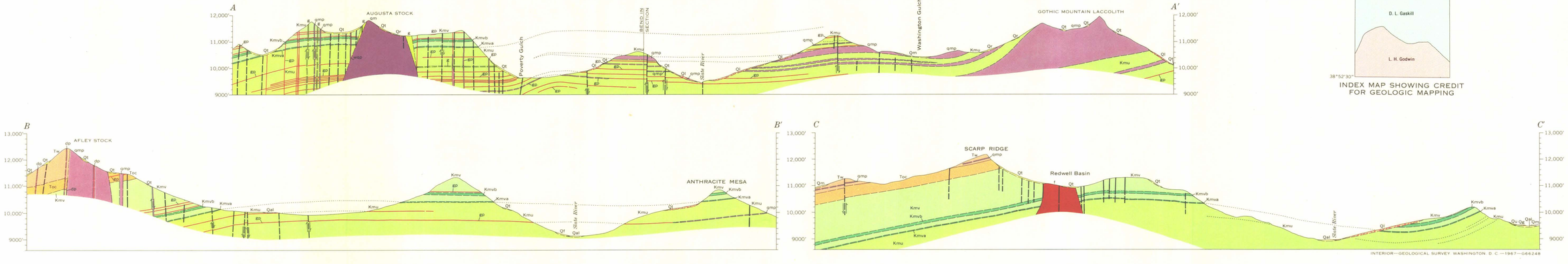
ECONOMIC GEOLOGY

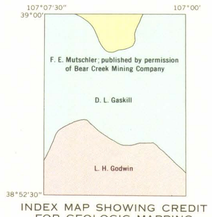
About six coal beds are found in a zone about 250 feet thick that overlies the second sandstone unit in the Mesaverde Formation. The coal is high volatile B bituminous and anthracite in rank; it has been mined at the Smith Hill Mine on Anthracite Mesa and the Peanut Mine along the Slate River. About 3 million tons of coal was produced from 1885 to 1954, but the coal mines have not operated since 1954. The coal was mined from beds 2 to 6 feet thick in the lower part of the coal-bearing interval. The writers estimate that original reserves of coal in beds over 14 inches thick with less than 1,000 feet of overburden total about 18 million tons.

Zinc, lead, silver, copper, molybdenum, and iron-sulfide deposits containing gold are associated with the north-northeast-trending system of faults, dikes, and small stocks of the Ruby Range and the breccia plug in Redwell Basin. Most of the prospects and mines were originally worked in the 1870's and 1880's; only the Standard lead-zinc-silver mine and the Painter Boy gold-silver-lead mine were operating in 1964.

Prospects for oil or gas seem to be marginal due to metamorphism and induration of the sedimentary rocks by intrusion of igneous rocks.

Extensive deposits of sand and gravel locally floor or form terraces in the Slate River valley and Washington Gulch. Gravel from a pit near Nicholson Lake has been utilized for road metal and local construction for many years. Indurated Mancos Shale in the Paradise stock area is a potential source of road metal.





INDEX MAP SHOWING CREDIT FOR GEOLOGIC MAPPING

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GEOLOGIC MAP OF THE OH-BE-JOYFUL QUADRANGLE, GUNNISON COUNTY, COLORADO

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For sale by U.S. Geological Survey, price $1.00