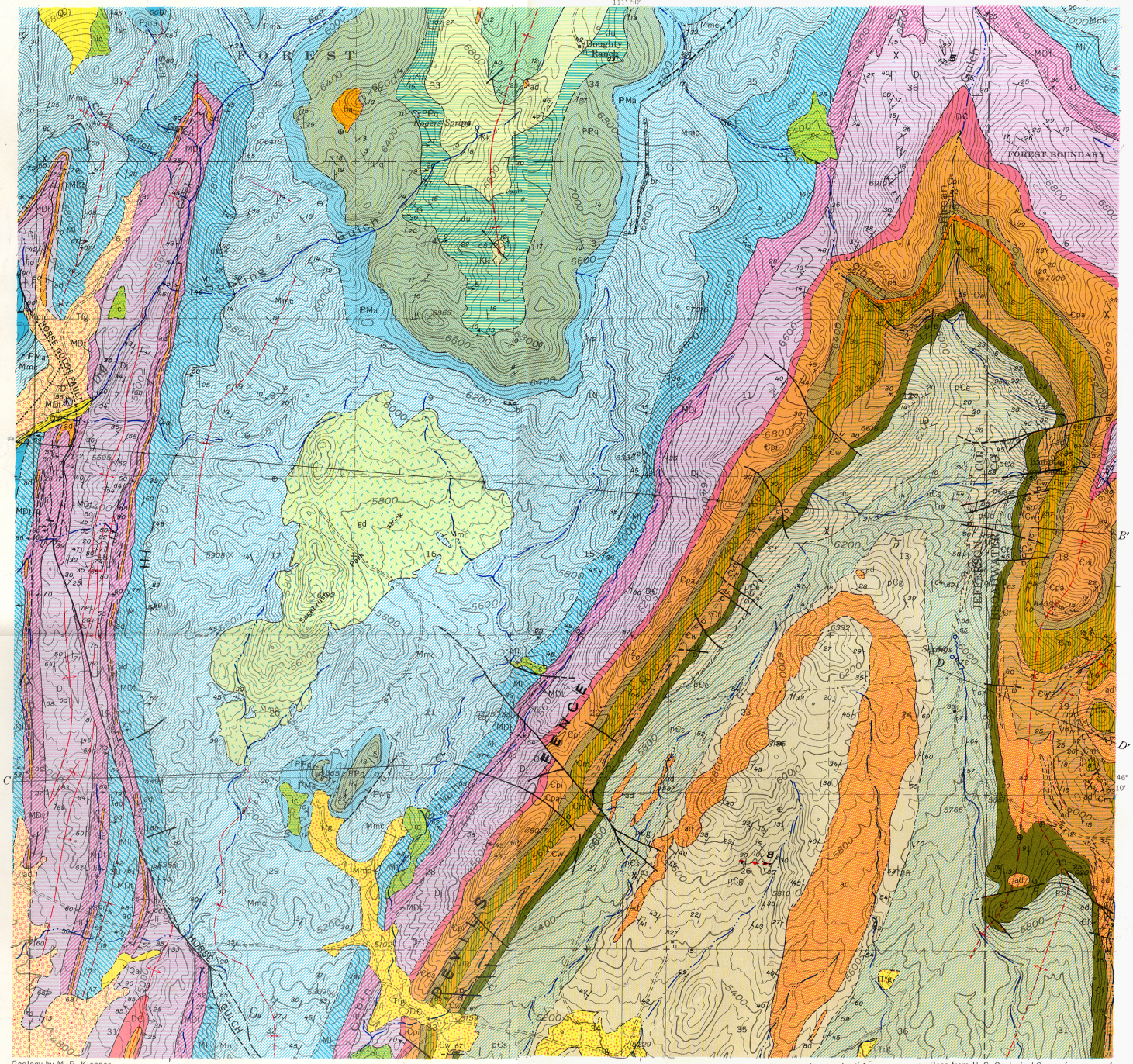
GEOLOGIC MAP OF DEVILS FENCE QUADRANGLE, MONT.



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Scale 1:31,250 — 1 — 0 — 2 Miles

Contour interval 40 feet
Datum is mean sea level

Base from U. S. Geological Survey from map of Devils Fence quadrangle, Montana.

EXPLANATION

QUATERNARY

Recent

Qal — Alluvium

Pliocene(?)

Tfg — Fan gravel and pediment gravel
Unconsolidated or weakly consolidated fan deposits and gravel veneer on pediments

Miocene(?)

Ttg — Tuff and gravel
Light-colored rhyolitic tuff with a few interbeds of stream gravel

UNCONFORMITY

TERTIARY

Lower and Upper Cretaceous

Kcm / Kcl — Colorado formation
Upper black shale unit not mapped. Middle silt-stone mudstone and sandstone, Kcm, in upper, tongued marine and nonmarine shale, siltstone, and siltstone, and siltstone, in part of volcanic origin. Lower black shale unit, Kcl, is a broad tan-weathering quartz sandstone, drab and olive-gray blocky siltstone, very dark gray to black shale, and an upper dark-gray carbonaceous, limonitic speckled to mottled sandstone

ERODSIONAL UNCONFORMITY

CRETACEOUS

Lower Cretaceous

Kk — Kootenai formation
Comprises three units. Upper unit is 10 to 25 ft of gastropod-bearing limestone overlain by a few feet to 60 ft of drab mudstone; middle unit is red and green mudstone and shale with concretions and lentils of limestone; lower unit is crossbedded "pepper-and-salt" sandstone and interbedded shale and mudstone

Upper Jurassic

Js — Morrison and Swift formations
Morrison formation: varicolored nonmarine shale, mudstone, and sandstone with thin beds of limestone and sandstone, and near the top a unit of black shale. Upper hundred feet is mostly black shale (noticeable "pepper-and-salt" sandstone and grades into overlying Kootenai formation
Swift formation: greyish-brown sandy calcareous marine sandstone, 20 to 25 ft thick, with a basal chert-pebble conglomerate

JURASSIC

ERODSIONAL UNCONFORMITY

PPq / PPq — Phosphoria formation
Brown and gray chert and sandstone, in part phosphatic; may locally contain one or two thin beds of phosphate rock, Pp. In places mapped with the Quadrant formation, PPq

PENNSYLVANIAN

Pq — Quadrant formation
Light-colored quartzitic sandstone and interbedded light-gray sugary-textured sandy dolomite

PERMIAN

PMa — Amsden formation
Red to grayish-red mudstone, shale, and subordinate amounts of carbonate rock with interbeds of gray, brown, or yellow argillaceous sandstone in upper and lower parts; middle part of medium- to dark-gray thick-bedded dolomite

ERODSIONAL UNCONFORMITY(?)

MISSISSIPPIAN

Mmc — Mission Canyon limestone
Medium-gray to light-gray medium-grained thickly and indistinctly bedded limestone, with a few thin siltstone beds in lower 200 ft and sparse gray chert nodules and lenses in upper half. A breccia unit, br, about 200 ft below top of formation has been mapped locally

Madison group

Ml — Lodgepole limestone
Upper part of medium-gray fine- to medium-grained limestone in distinct beds as much as 2 ft thick alternating with subordinate amounts of light-containing rare quadrate partings; lower part of medium-gray limestone in beds 1 in. to 1 ft thick with partings and interbeds of yellow to red calcareous mudstone; grades into Mission Canyon limestone through a 150- to 200-ft zone

CARBONIFEROUS

Upper Devonian and Mississippian

MDt — Three Forks shale
Predominantly greenish-gray and brown shale with subordinate amounts of interbedded sandstone and limestone. Dolomitic siltstone at top. Locally a 10- to 25-ft fossiliferous limestone unit, l, has been mapped

DEVONIAN

Upper Devonian

Dj — Jefferson dolomite
Dark-gray granular-weathering faint well-bedded dolomite with subordinate amounts of dark-gray limestone and light-gray dolomite

Upper Cambrian and Upper Devonian

ERODSIONAL — **DC** — *UNCONFORMITY*

Maywood and Red Lion formations undifferentiated, *Variegated, generally in shades of red and yellowish-brown, argillaceous, dolomitic, and calcareous rocks; poorly exposed*

Upper Cambrian

Cpi — Pilgrim dolomite
Comprises three units. Upper unit is light-gray thick-bedded dolomite commonly mottled medium-gray near base. Middle unit is light- to medium-gray crystalline limestone irregularly ribboned with yellowish-gray silty dolomite. Lower unit is mottled light- and dark-gray dolomite with sparse intraformational conglomerate; locally, basal 8 to 10 ft is black-gray limestone

Cpa — Park shale
Olive-gray, gray, and light-brown shale with minor amounts of argillaceous limestone, siltstone, and sandstone

Middle Cambrian

Cm — Meagher limestone
Comprises three units. Upper and lower units are medium-gray limestone irregularly ribboned or mottled with yellowish-orange, yellowish-brown, and yellowish-gray dolomite. Middle unit is thickly and indistinctly bedded medium-gray limestone, commonly with oolitic beds

CAMBRIAN

Middle Cambrian

Cw — Wolsey shale
Upper half is interbedded gray argillaceous limestone and greenish- and yellowish-gray calcareous mudstone and shale. Lower half is greenish-gray and drab shale with some interbeds of sandstone and limestone; many beds are micaceous, some are glauconitic

Cf — Flathead quartzite
White to pale shades of gray, pink, brown, and purple medium- to thick-bedded homogeneous even-grained quartz sandstone; most beds are cemented to vitreous quartzite; thin, discontinuous coarse pebble zones in lower part; crossbedding common

UNCONFORMITY

Upper Precambrian Belt series

pCe — Empire shale
Gray, greenish-gray, and brown, siliceous mudstone or argillite with interbeds of quartzite sandstone and shale. Intertongues with Spokane shale

pCs — Spokane shale
Greyish-red mudstone, shale, and sandstone, with a few thin beds of limestone near base

pCg — Greyson shale
Gray and brown mudstone or shale alternating with sandstone or quartzite. Base not exposed. Grades into Spokane shale

PRECAMBRIAN

INTRUSIVE ROCKS

YOUNGER INTRUSIVE ROCKS

Lower Tertiary(?)

gd — Granodiorite and quartz diorite
In Sagebrush Park stock

ic — Composite or hybrid intrusive
Small plutons containing diverse and unusual rocks including olivine-rich and quartz-rich types

TERTIARY(?)

OLDER INTRUSIVE ROCKS

Upper Cretaceous

bp — Basalt and related rocks
Dark-gray to greenish-black fine- to medium-grained rocks, mainly as sills

ad — Andesite porphyry, diorite porphyry, and related rocks
Greenish-gray to dark-gray porphyritic rocks with phenocrysts of plagioclase and hornblende or augite; mainly as sills

hl — Hornblende lamprophyre
Very fine grained gray rock with conspicuous hornblende phenocrysts

CRETACEOUS

67 — Contact, showing dip
Dashed where approximately located; length of dashes indicates relative degree of accuracy; long dash most accurate

90 — Vertical contact

Overturned contact

U 30 39 D — Fault, showing dip
Dashed where approximately located; length of dashes indicates relative degree of accuracy; long dash most accurate. Dotted where concealed; queried where doubtful. U, upthrown side; D, downthrown side

F — Preintrusion fault
Forming boundary along margin of intrusive body; dashed where approximately located

Anticline
Showing crestline and plunge of axis. Dashed where approximately located; length of dashes indicates relative degree of accuracy; long dash most accurate. Dotted where concealed; queried where doubtful

Syncline
Showing position of trough and plunge of axis. Dashed where approximately located; length of dashes indicates degree of accuracy; long dash most accurate. Dotted where concealed; queried where doubtful

Overturned anticline

13 — Strike and dip of beds

90 — Strike of vertical beds

Horizontal beds

50 — Strike and dip of cleavage

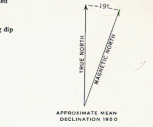
17 — Strike and dip of joints

90 — Vertical vein, approximately located

85 — Vein, approximately located, showing dip

Vertical shaft

Adit

Prospect pit

Mine