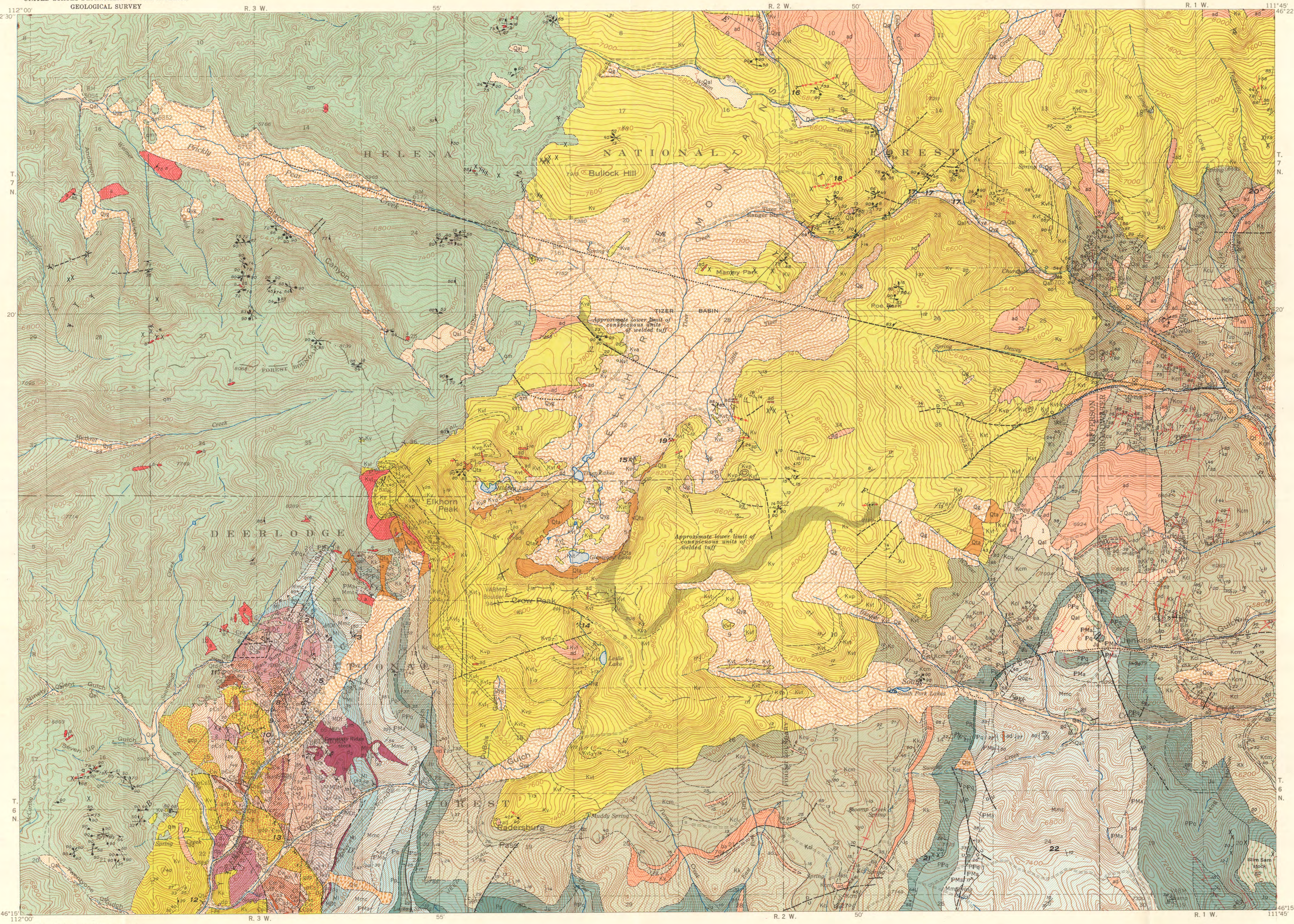


Base from U. S. Geological Survey map of Clancy quadrangle, Montana

EXPLANATION

QUATERNARY

Recent

Qtd — Tailings and dumps

Qal — Alluvium
Includes recently formed fans along Crow Creek

Qta — Talus and hill wash
Only a few of the larger and more conspicuous deposits are shown

Qls — Landslides

Pleistocene

Qt — Terrace deposits
Gravel-veneer benches along Crow Creek and tributaries and Elkhorn Creek; probably late Pleistocene

Qg, Qyg, Qog — Glacial deposits
Moraines, kame terrace deposits, and other glacial deposits of at least two stages, Qg. Older deposits, Qog, mainly high-level terminal and lateral moraines. Younger deposits, Qyg, mainly valley trains and lateral and terminal moraines at lower levels

TERTIARY

Pliocene (?)

Tr — Rhyolite
Medium- to dark-gray columnar-jointed flow-banded rhyolite in valley of Crow Creek

MAJOR ANGULAR UNCONFORMITY AND EROSION INTERVAL

FOLDING AND FAULTING

CRETACEOUS

Upper Cretaceous

Kv (Kvt, Kvp, Kva, Kvf, Kvl) — Elkhorn Mountains volcanics
Dark-greenish-gray, grayish-green, greenish-black, dull-reddish-gray, and dull-purplish-gray pyroclastic rocks, water-laid tuff, conglomerate, and flows, mainly of andesitic composition; welded tuff of probable quartz latitic composition interlayered in upper part. Tuff, coarse pyroclastic rocks, welded tuff, flows, and limy sediments are indicated Kvt, Kvp, Kva, Kvf, *and* Kvl *respectively; where order of superposition is known, individual units are designated* Kvf_1, Kvf_2, Kvt_1, Kvt_2, Kvt_3, Kvt_4, Kvl_1, *and* Kvl_2. *Includes andesitic and dioritic dikes, sills, and other hypabyssal intrusives not mapped separately*

LOCAL UNCONFORMITY

Ks — Slim Sam formation
Greenish-gray feldspar sandstone beds with interbeds of crystal tuff and gray shale or mudstone. In places grades upward into volcanic rocks; elsewhere absent owing to late Cretaceous erosion

Lower and Upper Cretaceous

Kc (Kcu, Kcm, Kcl, k) — Colorado formation
Comprises three units. The upper black shale unit, Kcu, *is very dark gray to black fissile shale with interbedded dark-gray fine-grained sandstone and siltstone in lower part. Shale contains sparse concretions of dense limestone and grades into Slim Sam formation. The middle siliceous mudstone and sandstone unit,* Kcm, *is intertongued marine and nonmarine sandstone, mudstone, and siliceous mudstone, in part of volcanic origin. The lower black shale unit,* Kcl, *is a basal 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. In areas of poor exposure not subdivided,* Kc, *but key sandstone,* k, *near base of middle unit has been mapped*

EROSIONAL UNCONFORMITY

Lower Cretaceous

Kk, ls — Kootenai formation
Comprises three units. Upper unit is 10 to 25 ft of gastropod-bearing limestone, ls, *overlain by a few feet to 80 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*

JURASSIC

Upper Jurassic

Ju — Morrison and Swift formations
Morrison formation: varicolored nonmarine shale, mudstone, and siltstone, with thin beds of limestone and sandstone, and near the top a unit of black shale. Upper hundred feet locally contains thick, lenticular "pepper-and-salt" sandstone and grades into overlying Kootenai formation
Swift formation: grayish-brown punky calcareous marine sandstone, 20 to 35 ft thick, with a basal chert-pebble conglomerate.

EROSIONAL UNCONFORMITY

PERMIAN

Pp, 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

CARBONIFEROUS

PENNSYLVANIAN

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

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

EROSIONAL UNCONFORMITY(?)

MISSISSIPPIAN

Madison group

Mmc — Mission Canyon limestone
Medium-gray to light-gray medium-grained thickly and indistinctly bedded limestone, with a few thin siliceous layers in lower 200 ft and sparse gray chert nodules and lentils in upper half

Ml — Lodgepole limestone
Upper part of medium-gray fine- to medium-grained limestone in distinct beds as much as 3 ft thick alternating with zones of much thinner beds containing rare mudstone 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

DEVONIAN AND MISSISSIPPIAN

Upper Devonian and Mississippian

MDt, li — 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, li, *has been mapped*

DEVONIAN

Upper Devonian

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

EROSIONAL UNCONFORMITY

Upper Cambrian and Upper Devonian

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

CAMBRIAN

Upper Cambrian

Ꞓpi — 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 bluish-gray limestone

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

Middle Cambrian

Ꞓm — 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

Ꞓw — 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

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

UNCONFORMITY

PRECAMBRIAN

Upper Precambrian — Belt series

pꞒs? — Spokane? shale
Dark-gray hornstone beds; some reddish and purplish beds in lower part; upper part may be Empire shale

INTRUSIVE ROCKS

YOUNGER INTRUSIVE ROCKS

CRETACEOUS AND TERTIARY (?) — *Upper Cretaceous and Lower Tertiary(?)*

a — Alaskite, aplite, and related rocks
Light-colored rocks consisting of potash feldspar and quartz with sparse plagioclase and biotite; texture ranges from aplitic through coarse equigranular to pegmatitic

gd — Granodiorite and granodiorite porphyry
Medium-gray granodiorite and quartz monzonite of Slim Sam stock, and granodiorite porphyry of small plutons at mouth of Swamp Creek and along Jenkins Gulch

qm — Quartz monzonite and related rocks
Light-gray to medium-gray biotite-hornblende quartz monzonite and granodiorite of the Boulder batholith; in places grades into a porphyritic facies, and locally near the border of the batholith, into a darker, and generally somewhat finer grained facies

gdp — Granodiorite porphyry
Medium-gray granodiorite or quartz monzonite porphyry with conspicuous phenocrysts of plagioclase and euhedral to rounded quartz grains in an aphanitic groundmass; in part microbrecciated and seamed with cryptocrystalline silica

g — Gabbro and diorite
Dark-gray to black, medium- to coarse-grained gabbro and diorite; forms Black Butte stock and small stock west of Elkhorn

d_2 — Diorite
Relatively homogenous medium-grained biotite-hornblende diorite; forms Cemetery Ridge stock

dp — Diorite porphyry
Light- to dark-gray diorite porphyry with abundant phenocrysts of plagioclase and conspicuous clusters and small phenocrysts of hornblende; forms irregular intrusive body near mouth of Queen Gulch

d_1 — Fine-grained diorite
Greenish-gray fine-grained diorite; forms stock at mouths of Turnley Creek and Queen Gulch

OLDER INTRUSIVE ROCKS

CRETACEOUS — *Upper Cretaceous*

ba — 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; forms sills, dikes, and small plutons

Contact, showing dip
Dashed where approximately located; length of dashes indicates relative degree of accuracy; long dash most accurate. Dotted where concealed; queried where doubtful

Gradational contact

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*

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

Inferred position of fault engulfed by intrusive

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

Strike and dip of beds

Strike of vertical beds

Horizontal beds

Strike and dip of cleavage

Strike of vertical cleavage

Strike and dip of joints

Strike of vertical joints

Strikes and dips of multiple joint sets

Vein, approximately located, showing dip
q, *indicates zone of quartz stringers*

Vertical shaft

Adit

Caved adit

Trench

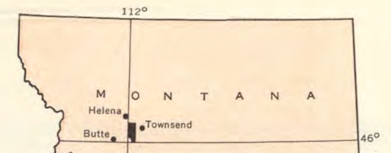
Prospect pit

Mine

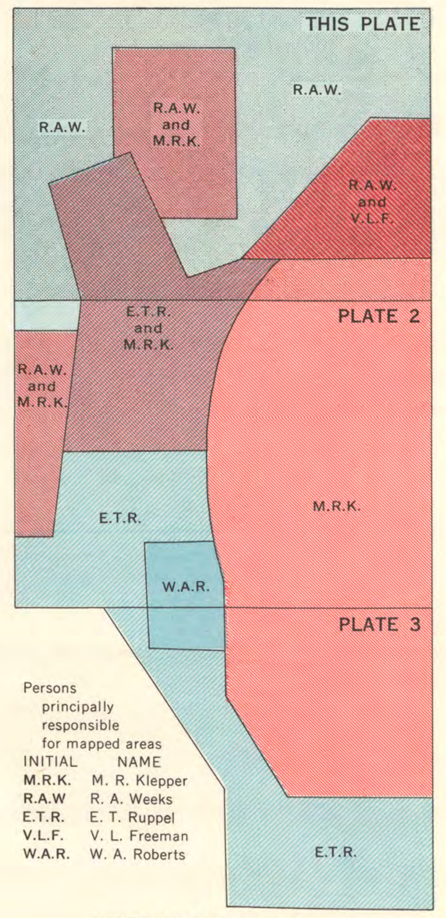
Opencut

LIST OF MINES IDENTIFIED BY NUMBER

1 Elkhorn Peak iron
2 Union
3 C and D
4 Golden Moss
5 Klondyke
6 Keene
7 Elkhorn (Holter)
8 Dolcoath
9 Swissmont-Pittsmont
10 Carmody-Papesh
11 Golden Curry (Sourdough, Jacquemin)
12 Tourmaline Queen
13 Bulwer (Bulware, Bouloware) and adjacent claims
14 Skyline
15 Black Jack
16 Belle
17 Wilson and Crow Creek placers
18 Callahan (Golden Age, Deer Horn)
19 Center Reef (Ballard)
20 MacFadgen-Nave
21 Summit(?)
22 Bonanza



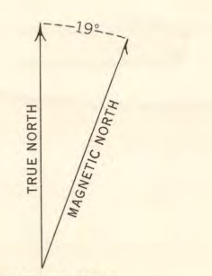
INDEX MAP



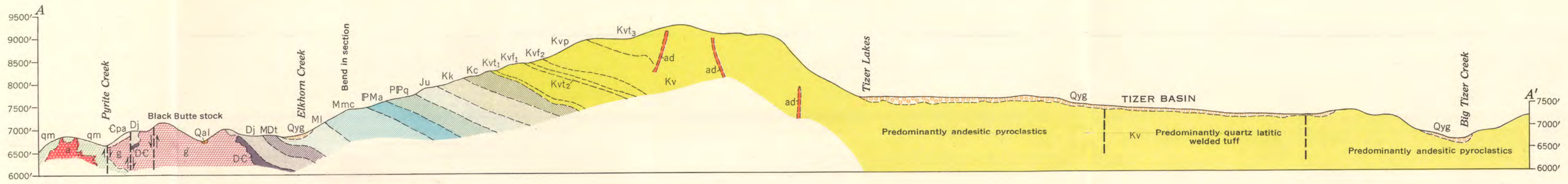
Persons principally responsible for mapped areas

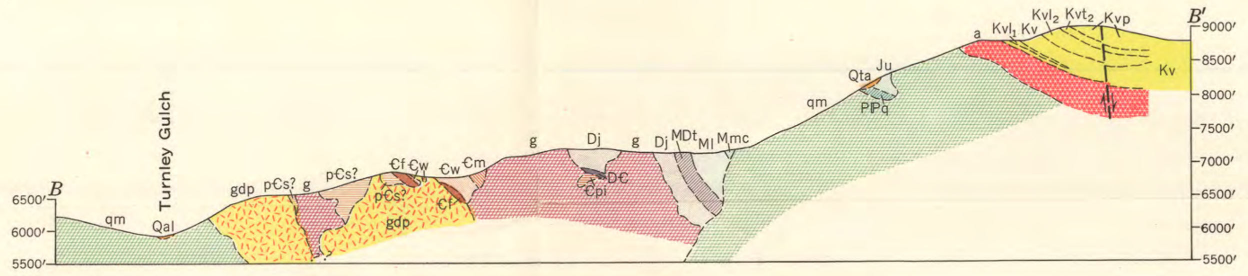
INITIAL	NAME
M.R.K.	M. R. Klepper
R.A.W	R. A. Weeks
E.T.R.	E. T. Ruppel
V.L.F.	V. L. Freeman
W.A.R.	W. A. Roberts

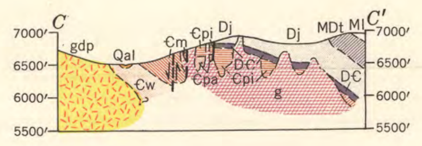
INDEX TO AREA MAPPED

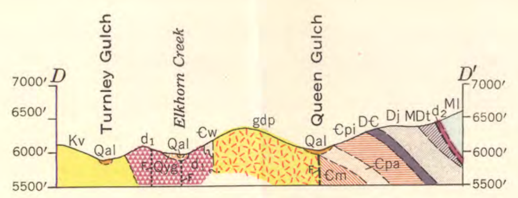


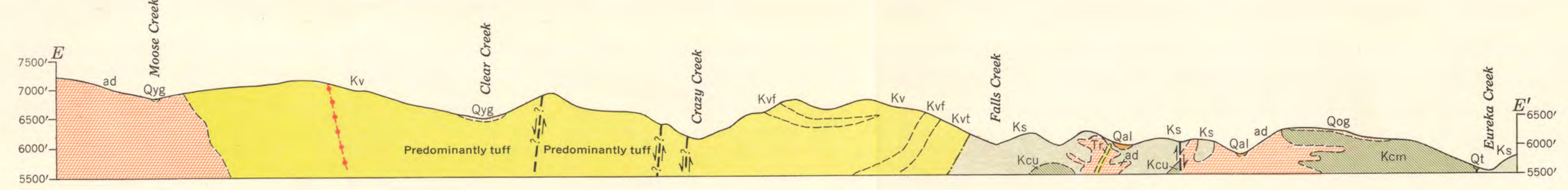
APPROXIMATE MEAN DECLINATION 1950

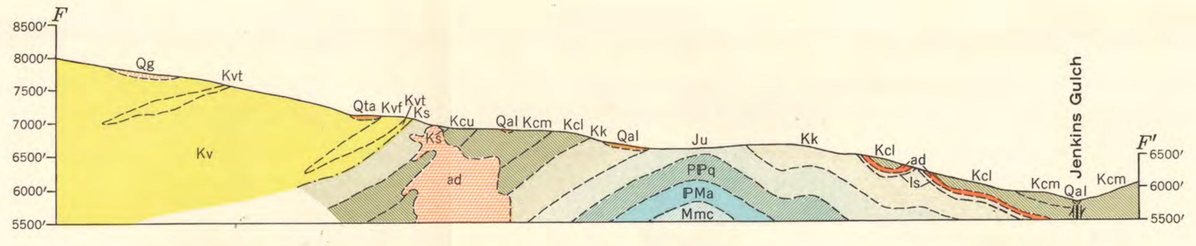












GEOLOGIC MAP AND SECTIONS, SOUTH HALF OF CLANCY QUADRANGLE, MONTANA

Scale 1:31,250

1 0 2 Miles

Contour interval 40 feet
Datum is mean sea level

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M R-4433