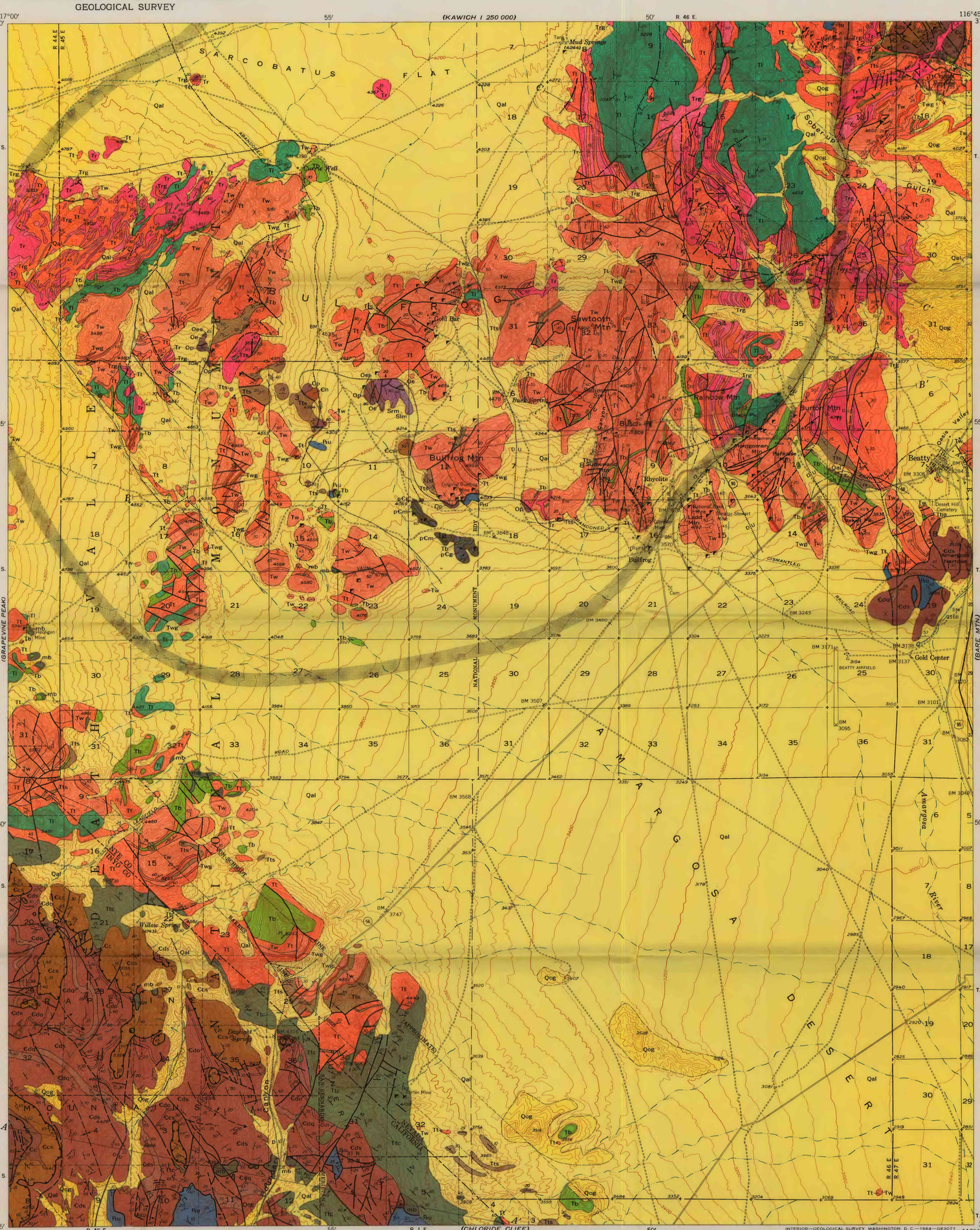


Base map by Topographic Division
U.S. Geological Survey

SCALE 1:48 000

1 ½ 0 1 2 3 MILES

1 .5 0 1 2 3 KILOMETERS

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1964—G63077

Geology by H. R. Cornwall and F. J. Kleinhampl,
1956–1960, U.S. Geological Survey

EXPLANATION

QUATERNARY

Pleistocene and Recent

Qal — **Alluvium**
Fan and stream gravels flanking mountains and hills and grading outward into sands and silts in valley bottoms

Qog — **Older gravels**
Boulders, cobbles, and finer material of varied lithology in older partly dissected fans

TERTIARY

Miocene and Pliocene

Tr | Trg — **Rhyolite and rhyodacite**
Tr, *dikes, irregular stocks, and flows of gray to reddish-brown rhyolite and rhyodacite, partly porphyritic with phenocrysts of feldspar, quartz, and biotite*
Trg, *parts of the bodies that are glassy*

Tb | Tba — **Basalt and basanite**
Tb, *dark-gray to black fine-grained porphyritic basalt flows and dikes*
Tba, *basanite, occurs locally as a facies of basalt and has analcite in the groundmass. Both types contain phenocrysts of olivine, plagioclase, and locally augite*

Tl — **Latite**
Brownish-gray to reddish-brown fine-grained porphyritic latite flows and intrusions, contain phenocrysts of oligoclase or andesine, biotite, and a little augite or pigeonite

ANGULAR UNCONFORMITY

Tw | Twg — **Welded tuff**
Tw, *stony, rhyolitic, welded tuff; gray to reddish-brown, partly eutaxitic or spherulitic; commonly contains partly broken crystals of sanidine, oligoclase, quartz, and biotite, and fragments of stony and glassy rhyolite, and rarely basalt*
Twg, *glass zones occur at the base of welded tuff units, and locally in the interior or upper parts*

Tt — **Tuff**
White, gray, and yellowish-brown tuff; loosely consolidated to well lithified; mostly massive, but locally stratified; contains broken crystals of sanidine, plagioclase, quartz, and biotite, and small fragments of pumice, stony rhyolite, rhyolitic glass, and basalt in a pumiceous matrix

Tts — **Sedimentary rocks in tuff**
Interbedded tuffaceous sandstone, siltstone, shale, conglomerate, and tuff; colors are gray, greenish, yellowish, and brownish gray, reddish brown, and black; locally contain lenses as much as 40 feet thick of brownish- and dark-gray aphanitic cherty limestone

UNCONFORMITY

Oligocene

Ttc — **Titus Canyon Formation of Stock and Bode (1935)**
Red, brown, and gray conglomerate with conspicuous pebbles and cobbles of black chert and white to light-brown quartzite; contains interbeds, most abundant in the lower and upper parts, of red, yellow, green, and gray muddy limestone, siltstone, sandstone, and tuff

MESOZOIC AND TERTIARY

mb — **Monolithologic breccia**
Monolithologic breccia of Lower and Middle Cambrian limestone and dolomite; formed for the most part, if not entirely, by landslide during the Mesozoic and Tertiary

ANGULAR UNCONFORMITY

PALEOZOIC

Pu — **Rocks, undifferentiated**
Moderate sized areas of quartzite near south margin of quadrangle and isolated areas elsewhere of limestone, dolomite, quartzite; and a little shale

Limit of caldera

Contact
Dashed where approximately located

Normal or reverse fault, showing dip
Dashed where approximately located; dotted where concealed.
U, *upthrown side;* D, *downthrown side*

Thrust fault, showing dip
Dashed where approximately located, dotted where concealed. Sawteeth on upper plate

Anticline
Showing trace of axial plane and direction of plunge of axis; dashed where approximately located

Syncline
Showing trace of axial plane; dashed where approximately located

Upper Ordovician

Slm — **Lone Mountain Dolomite**
Indistinctly stratified, massive, homogeneous fine- to medium-grained partly recrystallized saccharoidal dolomite. Weathers to a pitted light-gray surface. Fragments of poorly preserved crinoid stems abundant locally

Srm — **Roberts Mountains Formation**
Light- to dark-gray dolomite, calcareous dolomite, and limestone. Most of formation is faintly to distinctly stratified, laminated to thin bedded, and platy to slabby. Sandy and cherty dolomite at base. Platy limestone in middle part and dolomite in upper part. Uppermost dolomite partly recrystallized and transitional into overlying formation. Fossils abundant in middle of formation

Oes — **Ely Springs Dolomite**
Cherty dark-gray very thin bedded aphanitic to fine-grained dolomite; chert, as anastomosing and finely-intercalated lenses, constitutes 10 percent of entire formation but locally is much more abundant

Middle Ordovician

Oe — **Eureka Quartzite**
Vitreous quartzite with thin sandstone beds at the base and top. Quartzite is chiefly white and grayish orange with some brown staining fine grained with well-rounded and well-sorted grains, and distinctly to indistinctly thin to thick bedded with local faint low-angle cross-stratification

Lower and Middle(?) Ordovician

Op — **Pogonip Group**
Medium-gray limestone and olive-gray to olive-brown shaly limestone. Fossils are locally abundant

Upper Cambrian

Ꞓn — **Nopah Formation**
Fine- to coarse-grained light- to dark-gray dolomite and medium- to dark-gray limestone. Dolomite predominates in alternate thin and thick light- and dark-gray bands but is partly sandy in the lower part

Lower and Middle Cambrian

Ꞓc — **Carrara Formation**
Greenish-gray to brownish-gray micaceous shale with interstratified dark-gray very fine grained limestone and minor siltstone in lower half and white to orange and brown fine-grained limestone and marble in upper half. Ellipsoidal algal structures common in some limestones in lower half of formation, and shale of same part locally contains trilobite remains

Lower Cambrian

Ꞓcs — **Corkscrew Quartzite**
Light-gray, orange, and brown indistinctly stratified fine- to medium-grained quartzite. The quartzite is conglomeratic locally, laminated to thin bedded, partly cross stratified, and slabby to massive

Ꞓds | Ꞓdq | Ꞓdo — **Daylight Formation**
Interstratified zones as much as several hundred feet thick of sandstone, siltstone, shale and minor carbonate rock, and conglomerate. These rocks are commonly metamorphosed to phyllite, schist, quartzite, and marble. One bed in the upper part of the formation, shown on the map, is oolitic and contains archaeocyathids; adjacent shale contains olenellid trilobites
Ꞓds, *light olive-, greenish-, or brownish-gray micaceous shale and intercalated sandstone*
Ꞓdq, *light-gray quartzite*
Ꞓdo, *yellowish-brown oolitic limestone*

ANGULAR UNCONFORMITY

pꞒm | pꞒg — **Gneiss, schist, and pegmatite**
pꞒm, *quartz-feldspar-mica gneiss and schist, light and dark gray respectively*
pꞒg, *gneissic granite pegmatite, white*

Strike and dip of beds

Strike of vertical beds

Strike and dip of overturned beds

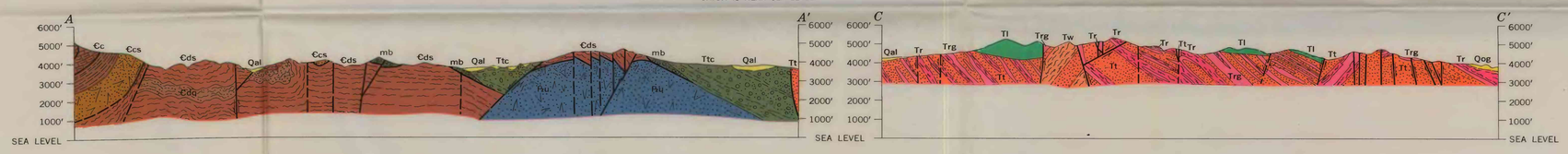
Strike and dip of foliation

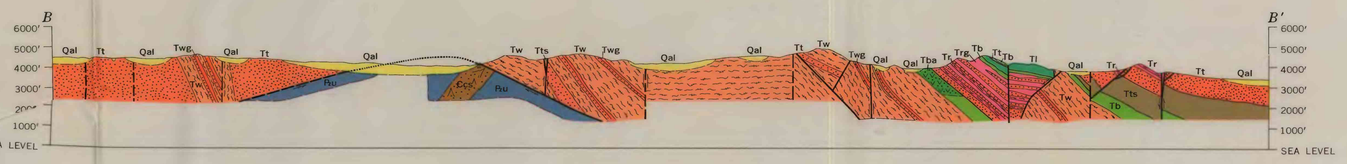
Strike of vertical foliation

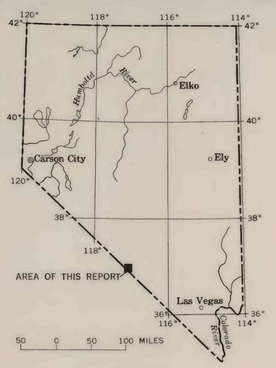
Shaft

Adit

Prospect pit







INDEX MAP

GEOLOGIC MAP AND SECTIONS OF THE BULLFROG QUADRANGLE, NEVADA-CALIFORNIA