

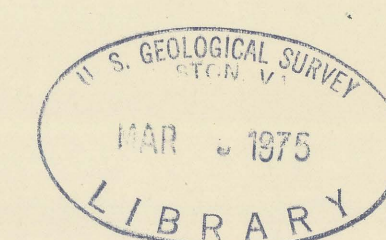
CORRELATION OF MAP UNITS					Holocene	QUATERNARY
Qa	Qf	Qt	Q1 (Km)	Qtr		
UNCONFORMITY					Oligocene	TERTIARY
Tn						
Trn						
Tf						
Tfn						
Ts						
Tb						
Tbn						
Tof						
Tbr						
Tt						
UNCONFORMITY					Upper Cretaceous	CRETACEOUS
Km						
Kdb						
UNCONFORMITY					Lower Cretaceous	
Jm						
Jj					Upper Jurassic	JURASSIC
UNCONFORMITY						
P					PRECAMBRIAN	PRECAMBRIAN
S						
wg						
cc						
s	a	h	f			

DESCRIPTION OF MAP UNITS

- Qa ALLUVIUM (HOLOCENE)
Qf FAN DEPOSITS (HOLOCENE)
Qt TALLS OR SLOPE-WASH DEPOSITS, OR COLLUVIUM UNDIVIDED (HOLOCENE)
Q1 LANDSLIDE DEPOSITS (HOLOCENE)--Some large areas in which the landslides are largely of Mancos Shale (Km) or Nelson Mountain Tuff (Tn) are indicated by symbol in parentheses
Qcr SPRING DEPOSITS (HOLOCENE)--Calcareous sinter deposited near springs
Tn NELSON MOUNTAIN TUFF (OLIGOCENE)--Light-gray to reddish-brown densely to moderately welded tuff; composite unit contains 20-30 percent phenocrysts of clear sanidine, plagioclase, quartz, and biotite in upper part and 8-20 percent phenocrysts in the more widespread lower part. Maximum exposed thickness about 60 m
Tm RAT CREEK TUFF (OLIGOCENE)--White to light-gray nonwelded to lightly welded tuff containing 5-15 percent clear feldspar and quartz crystals, and small biotite flakes; mostly characterized by abundant angular inclusions 2-8 cm in diameter of older volcanic rocks such as rhyodacite, other flow rocks, and tuff, as well as lesser amounts of Precambrian rocks. Maximum thickness 90 m
FISH CANYON TUFF (OLIGOCENE)
TF Crystal-rich welded tuff--Very light gray to light-brownish-gray tuff, welded and devitrified; contains 25-45 percent phenocrysts of calcic oligoclase, sanidine, quartz, and biotite. Maximum thickness about 100 m
Tfn Nonwelded tuff--White to light-gray unconsolidated tuff similar in composition to crystal-rich welded tuff (TF). Maximum thickness about 30 m
TUFF OF PRE-FISH CANYON AGE (OLIGOCENE)
Ts Densely welded red devitrified tuff--Contains 5-12 percent phenocrysts, largely of calcic oligoclase with smaller amounts of sanidine, quartz, and biotite. Probably equivalent to Sapinero Mesa Tuff. Maximum exposed thickness about 25 m
Tb Pale-creamy-gray densely welded phenocryst-poor tuff--Contains 3-10 percent phenocrysts of mostly clear sanidine and plagioclase. May be correlative with Bonanza Tuff. Maximum thickness 60 m
Tbn Nonwelded tuff--Similar in composition to the pale-creamy-gray tuff (Tb), but nonwelded to lightly welded. Possibly correlative with Bonanza Tuff. Maximum thickness about 60 m
Tg GRAVEL DEPOSITS (OLIGOCENE)--Gravels intertongue with the volcanic breccia (Tbr) and locally with younger ashflows. Thickness as much as 60 m
EARLY INTERMEDIATE-COMPOSITION FLOWS AND BRECCIAS (OLIGOCENE)
Tof Lava flows--Dense gray to red aphanitic quartz latite. Thickness about 150 m
Tbr Volcanic breccia--Grayish-brown tuff breccia and flow breccia. Maximum exposed thickness about 200 m
Tt Nonwelded unconsolidated tuff--Fine-grained. Thickness about 5-10 m

- Km MANCOS SHALE (UPPER CRETACEOUS)--Soft dark-gray-brown silty shale; scattered lenses of friable gray sandstone and calcareous concretions; landslides common. Upper part removed by erosion; maximum exposed thickness about 400 m
Kdb DAKOTA SANDSTONE (UPPER AND LOWER CRETACEOUS) AND BURRO CANYON FORMATION (LOWER CRETACEOUS)--Medium- to coarse-grained sandstone and quartzite; locally carbonaceous; scattered lenses of chert-pebble conglomerate in lower part. Thickness about 30-45 m
Jm MORRISON FORMATION (UPPER JURASSIC)--Greenish-gray to reddish-brown mudstone and siltstone. Maximum thickness about 90 m
Jj JUNCTION CREEK SANDSTONE (UPPER JURASSIC)--Fine- to medium-grained locally crossbedded eolian sandstone. Thickness 0-25 m
p PERMATITE (PRECAMBRIAN)--Showing dip
g RED GRANITE DIKES (PRECAMBRIAN)--Fine-grained red to pink granite
wg GRANITE OF WOOD GULCH (PRECAMBRIAN)--Coarse-grained pink porphyritic granite; forms conspicuous rounded outcrops
cc QUARTZ MONZONITE OF COCHETOPA CREEK (PRECAMBRIAN)
s METASEDIMENTARY ROCKS (PRECAMBRIAN)--Gray fine-grained moderately foliated schist, phyllite, and quartzite; represents metamorphosed siltstone, graywacke, and other fine-grained sediments
a AMPHIBOLITE (PRECAMBRIAN)--Greenish-black medium- to coarse-grained gneissic rock; occurs as irregular bodies that were probably dikes or sills of dioritic or gabbroic composition
h MAGIC FLOWS (PRECAMBRIAN)--Greenish-black fine-grained metabasalt; amygdules, breccia, and local pillow structures indicate volcanic origin
f FELSITE AND FELSITE PORPHYRY (PRECAMBRIAN)--Fine-grained metamorphosed rhyolite, quartz latite, and tuffaceous sedimentary rocks characterized by about 5-25 percent phenocrysts of albite-oligoclase and quartz in a microcrystalline groundmass. Relict eutaxitic texture, phenocrysts, and local presence of devitrified and recrystallized pumice lapilli indicate volcanic origin

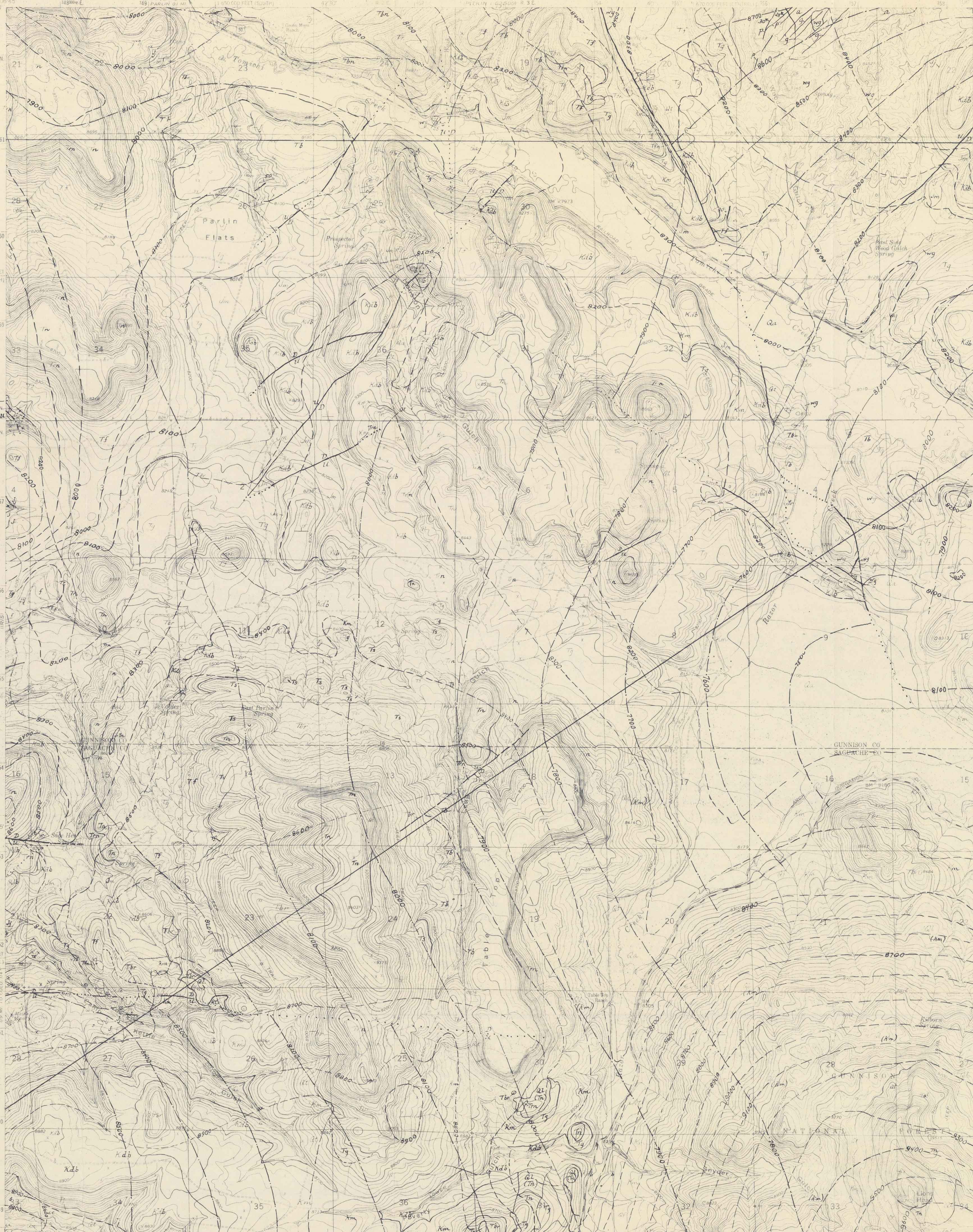
- CONTACT--Showing dip
FAULT--Showing dip. Dashed where inferred; dotted where concealed. U, upthrown side; D, down-thrown side
STRIKE AND DIP OF BEDS
Inclined
Vertical
Horizontal
STRIKE AND DIP OF FOLIATION
Inclined
Vertical
BEARING AND PLUNGE OF LINEATION--May be combined with foliation symbol
CONTOURS ON ANCIENT EROSION SURFACE--Approximately located. Contour interval 100 feet. Datum is mean sea level
Drawn on inferred and present configuration of erosional surface just beneath Tertiary volcanic rocks
Drawn on inferred and present configuration of erosional surface just beneath Jurassic sedimentary rocks
MINE WORKINGS
Prospect pit or small underground workings
Shaft of gold mine



Colorado (Houston Gulch quad). Geol. 1:24,000. 1975.
exp. 1

M(200)
R290

10.75-62
C.1



Base from U.S. Geological Survey, 1962

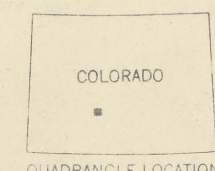
SCALE 1:24,000

Geology by J. C. Olson, 1969-1973

U.S. Geological Survey
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UTM GRID AND 1962 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 10 FOOT CONTOURS
DATUM IS MEAN SEA LEVEL



GEOLOGIC MAP OF THE HOUSTON GULCH QUADRANGLE, GUNNISON AND SAGUACHE COUNTIES, COLORADO

By
Jerry C. Olson
1975