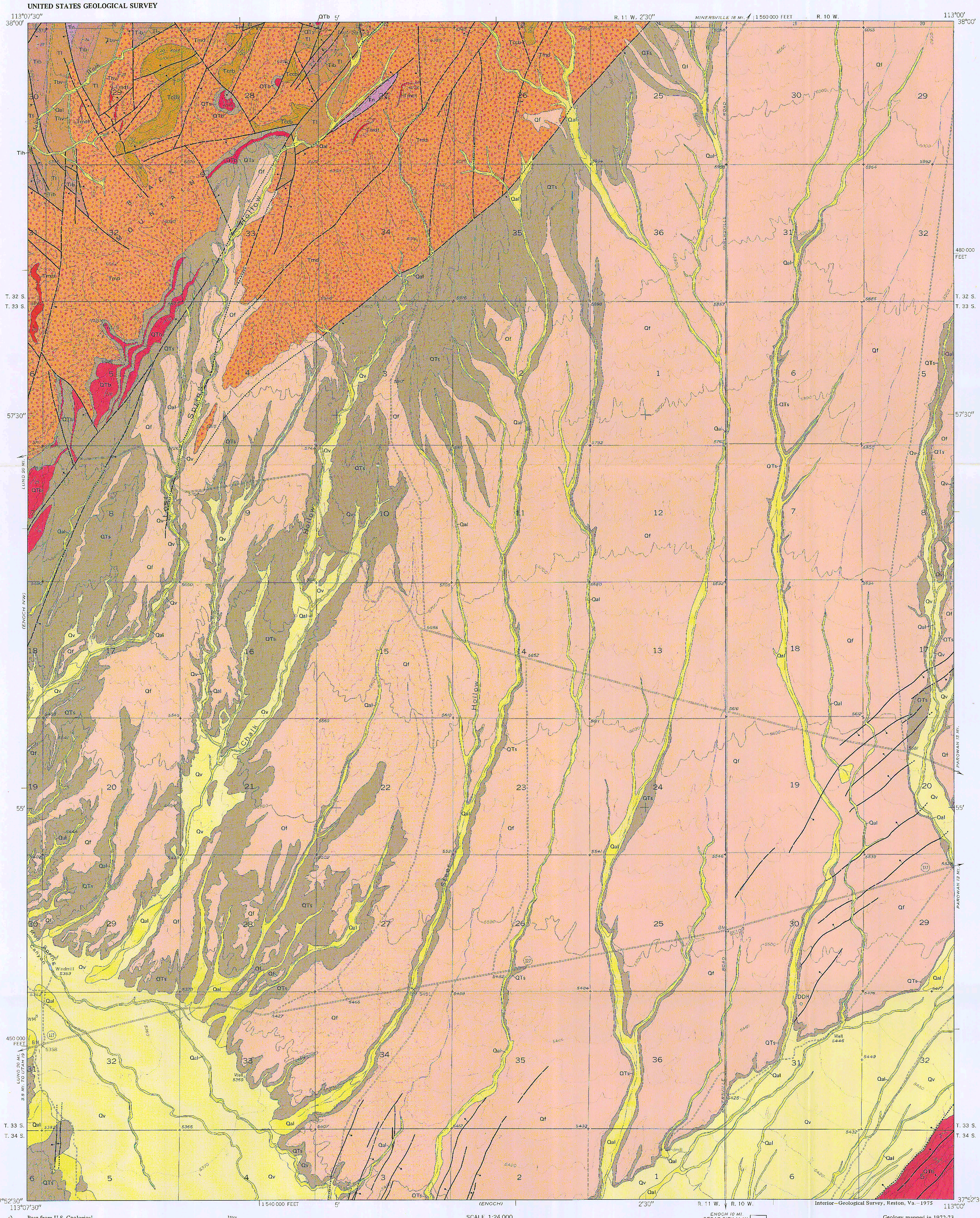
GL01530-DOC2

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

GEOLOGIC QUADRANGLE MAP
ENOCH NE QUADRANGLE, UTAH
GQ-1301



Base from U.S. Geological Survey, 1950
10,000-foot grid based on coordinate system, south zone

APPROXIMATE MEAN DECLINATION, 1975

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT HALF-INTERVAL CONTOURS
DATUM IS MEAN SEA LEVEL

QUADRANGLE LOCATION

Interior—Geological Survey, Reston, Va.—1975

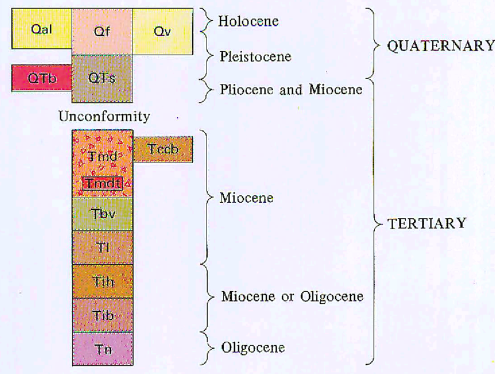
Geology mapped in 1972-73

GEOLOGIC MAP OF THE ENOCH NE QUADRANGLE, IRON COUNTY, UTAH

By
Peter D. Rowley

1975

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

Qal ALLUVIUM (HOLOCENE AND PLEISTOCENE) – Sand and less abundant pebble gravel deposited in intermittent stream channels, on bordering flood plains, and in fans of major drainages. Contact transitional with valley-bottom deposits (Qv) in some places. As much as several tens of feet (10 m) thick

Qf FAN AND PEDIMENT DEPOSITS (HOLOCENE AND PLEISTOCENE) – Silt, sand, and minor pebble gravel from local sources deposited in alluvial fans and on pediments. Includes minor colluvium. Contacts approximately located

Qv VALLEY-BOTTOM DEPOSITS (HOLOCENE AND PLEISTOCENE) – Clay, silt, and sand, mostly of alluvial origin. Made up in part of deposits of a Pleistocene lake outlet channel; this channel drained areas to the south and east, and carried water through Mud Spring Canyon into Escalante Bay of Lake Bonneville, 13 miles (21 km) west of the quadrangle (Dennis, 1943). Includes deposits of a Pleistocene lake (Thomas and Taylor, 1946) in southeastern part of mapped area. Contacts approximately located

QTs POORLY CONSOLIDATED SEDIMENTS (PLEISTOCENE, PLIOCENE, AND MIOCENE) – Mostly poorly consolidated light-gray, tan or red sandy fine-pebble to boulder conglomerate or coarse-grained sandstone, and colluvium derived from such deposits. Primarily of alluvial origin. Includes abundant clasts of Tertiary volcanic rock and, in places, brightly colored clasts of Mesozoic sedimentary rock. Provenance of the deposit is the Hurricane Cliffs, about 15 miles (24 km) east of the quadrangle, and the Black Mountains in the northwestern part of the quadrangle and to the north. Dissected by present streams. Locally overlain by a thin cover of younger Quaternary sediments. Contact with upper part of the Mount Dutton Formation is approximately located and probably transitional; contacts with younger deposits also approximately located. Locally interbedded with basalt. Roughly correlated with the Sevier River Formation (Callaghan, 1938). At least 500 feet (150 m) thick

The valley fill underlying the southern part of the mapped area and Cedar Valley, 2 miles (3 km) south of the quadrangle, is very thick. This valley fill probably consists mostly of poorly consolidated sediments (QTs). Cook and Hardman (1967) determined a significant gravity low for these areas and concluded that the valley fill occupies a complexly faulted graben with an estimated maximum depth to bedrock for a point just south of the mapped area of about 3,900 feet (1,200 m). This estimate is supported by results from the U.S. Steel Corporation diamond drill hole in sec. 31, T. 33 S., R. 10 W., which reached a total depth of 3,011 feet (918 m), all in valley fill

QTb BASALT LAVA FLOWS (PLEISTOCENE, PLIOCENE? AND MIOCENE?) – Resistant black to medium-gray or red vesicular lava flows of olivine basalt. Some lava flows flecked with red alteration products after olivine phenocrysts. Unit includes minor scoria. Thickness 0–100 feet (0–30 m), not including the interbedded poorly consolidated sediments (QTs)

Tmd MOUNT DUTTON FORMATION (MIOCENE) – Mostly volcanic mudflow breccia consisting of angular dark-gray, brown, or green pebble- to boulder-sized clasts of aphanitic mostly andesitic volcanic rocks contained in a light-gray or tan muddy matrix and unsupported by direct contact with each other. Weathers to boulder-strewn slopes. Includes thin white crystal-poor ash-flow(?) tuff. Correlated with the Mount Dutton Formation (Anderson and Rowley, 1975) of the Black Mountains and High Plateaus to the north and northeast, which has K–Ar ages that range from about 21 to 26 m.y. (Fleck and others, 1975). Bauers Member of the Condor Canyon Formation is interbedded with the unit locally. The Mount Dutton Formation above a stratigraphic horizon approximately equal to that of the Bauers Member is less resistant than the lower part, and consists in large part of alluvial sandstone and conglomerate, which increase in volume upward; this poorly exposed upper part of the formation probably was formed by erosional reworking of the volcanic mudflow breccia, and may be transitional with the poorly consolidated sediments (QTs). Maximum thickness at least 1,000 feet (300 m), thickening north of the mapped area and thinning southwest of the mapped area and absent south of the mapped area

Tmdt Ash-flow tuff – Resistant medium-brown or medium-purplish-gray densely welded autobrecciated crystal-poor (plagioclase; minor pyroxene and magnetite) ash-flow tuff. Located about 100–200 feet (30–60 m) above the base of the Mount Dutton Formation. Thickness 0-40 feet (0–12 m)

CONDOR CANYON FORMATION OF QUICHAPA GROUP (MIOCENE) – Defined by Cook (1965)

Tccb Bauers Tuff Member – Crystal-poor(plagioclase, lesser sanidine, and minor biotite and magnetite) ash-flow tuff consisting of several zones having the same mineral content. Upper zone is a poorly resistant white or light-tan slightly welded ash-flow tuff about 20 feet (6 m) thick. Underlain by a moderately resistant light-gray or tan moderately welded homogeneous ash-flow tuff (vapor-phase zone) containing biotite of a bronze color. Grades downward into a resistant brownish-red densely welded zone containing abundant thin gray ash-flow tuff lenticules as much as several feet (about 1 m) long. Base is a lustrous black densely welded vitrophyre several feet (about 1 m) thick. K-Ar age is about 22 m.y. (Armstrong, 1970). Defined by Mackin (1960). Intertongues with the Mount Dutton Formation. Thickness 0–100 feet (0–30 m)

Tbv BEAR VALLEY FORMATION (MIOCENE) – Poorly resistant pale-green to medium-green medium-grained sandstone and lesser sandy conglomerate. Defined by Anderson (1971), who concluded that the unit is mostly of eolian origin. Thickness 0-25 feet (0–8 m)

Tl LEACH CANYON FORMATION OF QUICHAPA GROUP (MIOCENE) – Poorly resistant white or tan slightly welded crystal-poor (plagioclase, quartz, sanidine; minor biotite, hornblende, and magnetite) ash-flow tuff, rich in dark aphanitic volcanic lithic fragments (5–10 percent of rock volume) and white noncompacted autolithic (?) pumice fragments (5–20 percent of rock volume). Pale-green to medium-green poorly resistant medium- to coarse-grained sandstone 0-15 feet (0–5 m) thick at base; this sandstone resembles that of the Bear Valley Formation. K-Ar age is about 24 m.y. (Armstrong, 1970). First defined as a member of the Quichapa Formation (Mackin, 1960), later elevated to formation status (Cook, 1965). Formation in this quadrangle consists mostly of the Table Butte Tuff Member (Williams, 1967; Anderson and Rowley, 1975). About 300 feet (90 m) thick

ISOM FORMATION (MIOCENE OR OLIGOCENE) – Defined by Mackin (1960)

Tih Hole-In-The-Wall Tuff Member – Moderately resistant tan densely welded crystal-poor (plagioclase; minor magnetite and pyroxene) ash-flow tuff containing abundant pinhead-sized vesicles and numerous thin light-gray ash-flow tuff lenticules as much as 1 foot (0.3 m) long. Thickness 0–10 feet (0–3 m)

Tib Baldhills Tuff Member – At least six cooling units of resistant medium-brown densely welded crystal-poor(plagioclase; minor pyroxene and magnetite) ash-flow tuff and some possible lava flows. Moderately to steeply dipping flowage structures characterize the tops of several upper cooling units. Some units have thin light-gray ash-flow tuff lenticules as much as 2 feet (0.6 m) long, and some have large vesicles drawn out as much as a foot (0.3 m) long by flowage. Several cooling units have black basal vitrophyres. K-Ar age is about 25–26 m.y. (Armstrong, 1970). As redefined by Anderson and Rowley (1975), consists of the Baldhills Member and a lowermost unnamed member of similar rock (Mackin, 1960). About 350 feet (105 m) thick

Tn NEEDLES RANGE FORMATION (OLIGOCENE) – Moderately resistant pink to light-reddish-purple moderately welded crystal-rich (plagioclase; lesser hornblende, quartz and biotite; minor magnetite and sanidine) ash-flow tuff. Contains white or pink ash-flow tuff lenticules as much as 4 inches (10 cm) long and 2 inches (5 cm) thick. K-Ar age is about 29 m.y. (Armstrong, 1970). Defined by Mackin (1960). Incomplete section; at least 150 feet (50 m) thick

CONTACT

HIGH ANGLE FAULT OF CENOZOIC AGE – Most are normal faults. Dashed where approximately located; dotted where concealed; queried where uncertain. Bar and ball on downthrown side

STRIKE AND DIP OF BEDS

DDH DIAMOND-DRILL-HOLE LOCATION

REFERENCES

Anderson, J. J., 1971, Geology of the southwestern High Plateaus of Utah—Bear Valley Formation, an Oligocene-Miocene volcanic arenite: Geol. Soc. America Bull., v. 82, no. 5, p. 1179–1205.

Anderson, J. J., and Rowley, P. D., 1975, Cenozoic stratigraphy of the southwestern High Plateaus, Utah, *in* Anderson, J. J., Rowley, P. D., Nairn, A. E. M., and Fleck, R. J., Cenozoic geology of southwestern High Plateaus of Utah: Geol. Soc. America Spec. Paper 160 (in press).

Armstrong, R. L., 1970, Geochronology of Tertiary igneous rocks, eastern Basin and Range province, western Utah, eastern Nevada, and vicinity, U.S.A.: Geochim. et Cosmochim. Acta, v. 34, no. 2, p. 203–232.

Callaghan, Eugene, 1938, Preliminary report on the alunite deposits of the Marysvale region, Utah: U.S. Geol. Survey Bull. 886–D, p. 91–143.

Cook, E. F., 1965, Stratigraphy of Tertiary volcanic rocks in eastern Nevada: Nevada Bur. Mines Rept. 11, 61 p.

Cook, K. L., and Hardman, Elwood, 1967, Regional gravity survey of the Hurricane fault area and Iron Springs district, Utah: Geol. Soc. America Bull., v. 78, no. 9, p. 1063–1076.

Dennis, P. E., 1943, Shore lines of the Escalante Bay of Lake Bonneville [Utah]: Utah Acad. Sci., Arts and Letters Proc., 1941–43, v. 19–20, p. 121–124 [1944?].

Fleck, R. J., Anderson, J. J., and Rowley, P. D., 1975, Chronology of mid-Tertiary volcanism, High Plateaus region, Utah, *in* Anderson, J. J., Rowley, P. D., Nairn, A. E. M., and Fleck, R. J., Cenozoic geology of southwestern High Plateaus of Utah: Geol. Soc. America Spec. Paper 160 (in press).

Mackin, J. H., 1960, Structural significance of Tertiary volcanic rocks in southwestern Utah: Am. Jour. Sci., v. 258, no. 2, p. 81–131.

Rowley, P. D., and Threet, R. L., 1975, Geologic map of the Enoch quadrangle, Iron County, Utah: U.S. Geol. Survey Geol. Quad. Map GQ–1296.

Thomas, H. E., and Taylor, G. H., 1946, Geology and ground-water resources of Cedar City and Parowan Valleys, Iron County, Utah: U.S. Geol. Survey Water-Supply Paper 993, 210 p. [1947].

Williams, P. L., 1967, Stratigraphy and petrography of the Quichapa Group, southwestern Utah and southeastern Nevada: Seattle, Washington Univ. Ph. D. thesis, 182 p.

For sale by U. S. Geological Survey
Denver, Colo. 80225 and Reston, Va. 22092, price $1.00