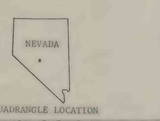
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

OPEN FILE REPORT
81-518
MANHATTAN QUAD., NEV.

Base from U.S. Geological Survey
This is an unedited advance print including field additions made in 1971



QUADRANGLE LOCATION

SCALE 1:24000

CONTOUR INTERVAL 40 FEET

DATUM IS MEAN SEA LEVEL

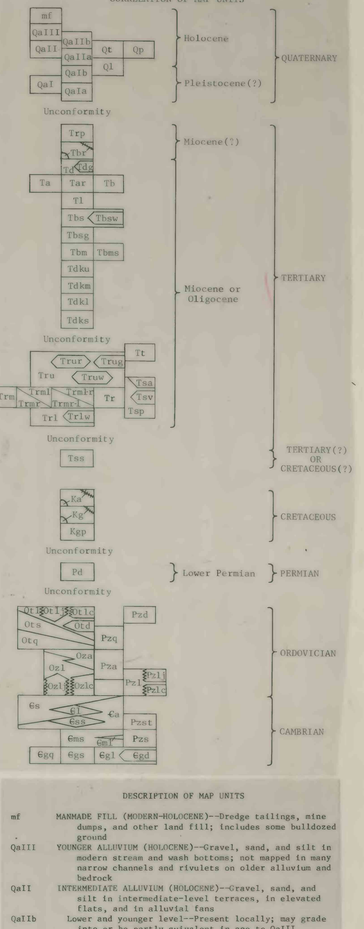
UTM GRID AND 1971 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

Geology mapped in 1975-79; assisted by E. E. Foord, 1978

GEOLOGIC MAP OF THE MANHATTAN QUADRANGLE, NYE COUNTY , NEVADA

By
Daniel R. Shawe
1981

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

mf MANMADE FILL (MODERN-HOLOCENE)--Dredge tailings, mine dumps, and other land fill; includes some bulldozed ground

QaIII YOUNGER ALLUVIUM (HOLOCENE)--Gravel, sand, and silt in modern stream and wash bottoms; not mapped in many narrow channels and rivulets on older alluvium and bedrock

QaII INTERMEDIATE ALLUVIUM (HOLOCENE)--Gravel, sand, and silt in intermediate-level terraces, in elevated flats, and in alluvial fans

QaIIb Lower and younger level--Present locally; may grade into or be partly quivalent in age to QaIII

QaIIa Higher and older level--Present locally

QaI OLDER ALLUVIUM (PLEISTOCENE?)--Boulder gravel and gravel in high-level terraces and in elevated flats; boulders commonly weathered and cracked; may grade into or be partly equivalent in age to QaIIa

QaIb Lower and younger level--Present along lower part of Bald Mountain Canyon and north of Clover Mountain; may grade into or be partly equivalent in age to QaIIa

QaIa Higher and older level--Present along lower part of Bald Mountain Canyon and north of Clover Mountain

Qt TALUS (HOLOCENE)--Steeply sloping accumulations of angular pieces of waste rock; mapped only in large patches or where talus obscures geologic contacts as on Ferguson Hill

Qp PEDIMENT GRAVEL (HOLOCENE)--Gravel on pedimented surface of Cretaceous granite in southeast corner of quadrangle

Ql LANDSLIDE (HOLOCENE AND PLEISTOCENE?)--Heterogeneous mixture of rock fragments and soil derived from nearby higher bedrock and sufficial materials

Trp RHYOLITE PLUGS (MIOCENE?)--Light-yellowish-brown flow-layered felsitic rhyolite, intensely altered hydrothermally; present as two small plugs about 3 km south of Manhattan. Undated

Tbr BRECCIA DIKES (MIOCENE?)--Dark-gray to buff breccia dikes; fragments of mostly granite and lesser amounts of Paleozoic sedimentary and metamorphic rocks in dark-gray glassy (volcanic?) matrix, about 3 km south of Manhattan. Undated

Td DACITE PLUGS, DIKES, AND SILLS (MIOCENE OR OLIGOCENE)--Light-brown to buff flow-layered dacite; present as (probably) two large plugs and as satellitic dikes and sills centered at low hill 5 km north-northwest of Manhattan. About 24 m.y. old

Tdg Dacite vitrophyre plugs--Dark-brown to dark-gray flow-layered porphyritic glass layers in devitrified flow-layered dacite; (Td) present 5 km north-northwest of Manhattan

Ta ANDESITE STOCK, SILLS, DIKES, AND PLUGS (MIOCENE OR OLIGOCENE)--Olive-brown porphyritic andesite; present in east-trending stock about 3 km long and 1 km wide south of Diamond King Hill, in numerous thick sills on and near Bald Mountain, and in many small dikes and plugs throughout quadrangle. About 23 m.y. old

Tar ANDESITE-RHYOLITE PLUG (MIOCENE OR OLIGOCENE)--Dark-olive-brown andesite and light-brown rhyolite as heterogeneous rock in small composite plug on southwest flank of Bald Mountain. Undated

Tb BASALT SILL AND DIKES (MIOCENE OR OLIGOCENE)--Dark-gray basalt or basaltic andesite; present as thin sill and dikes north of Bald Mountain Canyon. Undated

Tl LATITE DIKE AND PLUGS (MIOCENE OR OLIGOCENE)--Pale-greyish-brown biotite latite dike and plugs in southeast corner of quadrangle. About 24 m.y. old

Tbs QUARTZ LATITE TUFF (MIOCENE OR OLIGOCENE)--Light-greenish-buff and buff quartz latite ash-fall and ash-flow tuff; present on Bald Mountain and adjacent peaks, east of Bald Mountain Wash at east edge of quadrangle, and lying above a low-angle fault north and south of Bald Mountain Canyon. About 25 m.y. old

Tbsw Welded zone--Light-brown welded quartz latitic ash-flow tuff interlayered in unwelded zones (Tbs); present on peaks east of Bald Mountain, in northeast corner of quadrangle, and north of Bald Mountain Canyon

Tbsg BOULDER-BEARING TUFF (MIOCENE OR OLIGOCENE)--Buff ash tuff containing boulders, cobbles, and small fragments of granite, rhyolite, other volcanic rocks, and Paleozoic sedimentary and metamorphic rocks, at and near base of quartz latite tuff (Tbs); lithic-fragment content variable, locally mostly large granite boulders; locally brecciaitke; present on Bald Mountain and northeast of Bald Mountain Wash

Tbm CLAYSTONE AND SILTSTONE (MIOCENE OR OLIGOCENE)--Lake-deposited laminated buff claystone and siltstone composed of volcanic materials; present on Bald Mountain and elsewhere throughout north half of quadrangle. Part of Bald Mountain Member of Esmeralda Formation of Ferguson (1924, p. 46-48); incorrectly correlated with the Esmeralda Formation (upper Miocene) in the vicinity of Tonopah by Ferguson (1924, p. 53-55)

Tbms SANDSTONE AND CONGLOMERATE (MIOCENE OR OLIGOCENE)--Stream-deposited buff sandstone and conglomerate, of volcanic materials; present on Bald Mountain and elsewhere throughout north half of quadrangle. Part of Bald Mountain Member of Esmeralda Formation of Ferguson (1924, p. 46-48); incorrectly correlated with the Esmeralda Formation (upper Miocene) in the vicinity of Tonopah by Ferguson (1924, p. 53-55)

Tdku RHYOLITIC ASH-FLOW TUFF (MIOCENE OR OLIGOCENE)--Diamond King Member of Esmeralda Formation of Ferguson (1924, p. 46-48); incorrectly correlated with the Esmeralda Formation (upper Miocene) in the vicinity of Tonopah by Ferguson (1924, p. 53-55)
Upper unit--Light-brown crystal-rich rhyolitic vapor-phase ash-flow tuff, in part strongly welded; characterized by abundant smoky quartz dipyramids; present within Manhattan caldera

Tdkm Middle unit--Light-buff to light-pinkish-brown crystal-rich rhyolitic ash-flow tuff, in part strongly welded; characterized by abundant smoky quartz dipyramids; present within Manhattan caldera. About 26 m.y. old

Tdkl Lower unit--Buff crystal-rich rhyolitic ash-flow tuff; characterized by abundant smoky quartz dipyramids; present within Manhattan caldera

Tdks VOLCANIC SANDSTONE (MIOCENE OR OLIGOCENE)--Buff coarse-grained quartz-rich sandstone composed of rhyolitic volcanic materials; probably water laid; may be in part of base-surge origin; present within or at base of upper and middle units of rhyolitic ash-flow tuff within Manhattan caldera

Tt VOLCANIC MEGABRECCIA AND TALUS (MIOCENE OR OLIGOCENE)--Small to large fragments of Cretaceous granite in volcanic ash matrix; talus layers or vent facies of megabreccia underlying volcanic sandstone and interlayered in upper unit of silicic ash-fall tuff and ash-flow tuff; present in northeast corner of quadrangle

Tru SILICIC ASH-FALL AND ASH-FLOW TUFF (MIOCENE OR OLIGOCENE)--Round Rock Member of Esmeralda Formation of Ferguson (1924, p. 46-48); incorrectly correlated with the Esmeralda Formation (upper Miocene) in the vicinity of Tonopah by Ferguson (1924, p. 53-55)
Upper unit--Light-buff latitic, quartz-latitic, and rhyolitic poorly consolidated ash fall and ash-flow tuff; characterized by abundant lithic fragments; present within Manhattan caldera in north part of quadrangle. About 25 m.y. old

Trug Glass in upper unit--Dark-brown to dark-gray vitrophyric ash-flow tuff interlayered with ash-flow tuff layers; present in northwest corner of quadrangle

Truf Rhyolite breccia in upper unit--Buff to gray rhyolite fragments as large as 4 m in diameter in buff to greenish-buff ash matrix; fragments are smoothly rounded or angular; present in northeast corner of quadrangle

Truw Welded tuff in upper unit--Light-brown welded latitic ash-flow tuff; present in northwest corner of quadrangle

Trm Middle unit--Megabreccia of autobrecciated small to very large fragments of reddish-brown rhyolite (called Maris Rhyolite by Ferguson, 1924) and gray latite, locally in a matrix of light-buff volcanic ash; present within Manhattan caldera near its periphery and in north-central part of quadrangle

Trml Latite

Trmr Rhyolite

Trml-r Latite with some rhyolite

Trmr-l Rhyolite with some latite

Trl Lower unit--Light-buff latitic, quartz-latitic, and rhyolitic poorly consolidated ash-fall and ash-flow tuff; characterized by abundant lithic fragments; present within Manhattan caldera near its periphery and in north-central part of quadrangle

Trlw Welded tuff--Brown welded latitic ash-flow tuff, locally with dark-brownish-gray vitrophyre base; present in north-central part of quadrangle and 1.5 km north of Manhattan

Tr RHYOLITE PLUGS AND DIKES (MIOCENE OR OLIGOCENE)--Reddish-brown autobrecciated rhyolite (part of Maris Rhyolite of Ferguson, 1924); forms a probable volcanic neck and associated plug and dikes 5 km northwest of Manhattan; probable source of rhyolite of middle unit of silicic ash-fall tuff and ash-flow tuff

Tsp MEGABRECCIA OF SLOPPY GULCH (MIOCENE OR OLIGOCENE)--Small to immense fragments (larger ones autobrecciated) of Paleozoic sedimentary and metamorphic rocks, Cretaceous granite, and Tertiary volcanic rocks in buff volcanic ash matrix; larger fragments include slab of Permian Diablo Formation 300 m long 1.5 km north of Manhattan, block of limestone and argillite of Zanzibar Limestone 200 x 300 m on north side of Mustang Hill, slab of Paleozoic limestone 160 m long on northwest slope of Saltsbury Peak, and slab of Paleozoic schist 200 m long south of East Manhattan Wash near east edge of quadrangle. Megabreccia occurs as vent facies and interlayered in lower part of upper unit of silicic ash-fall and ash-flow tuff and in upper part of lower unit of silicic ash-fall and ash-flow tuff along south margin of Manhattan caldera, especially well exposed along Sloppy Gulch, and as outflow facies along East Manhattan Wash and 5 km south-southeast of Manhattan

Tsv Megabreccia of volcanic rock fragments; no Paleozoic rock fragments

Tsa Ash layers

Tss SYENITE-SHONKINITE PLUG (TERTIARY? OR CRETACEOUS?)--Light-pinkish-gray syenite to dark-greenish-gray shonkinite as heterogeneous rock in composite plug about 60 m in diameter 2 km south of Manhattan. Rock consists of variable amounts of major minerals (orthoclase and soda amphibole), several percent accessory minerals (apatite, sphene, and magnetite?), and minor plagioclase (oligoclase?), calcite, and pyrite (oxidized to limonite). Petrographic examination reveals as much as about 5 percent sphene locally. Undated; possibly Cretaceous or Tertiary

Ka APLITE SILLS AND DIKES (CRETACEOUS)--Light-gray to pale-buff aplite; present mostly as stile in Paleozoic sedimentary and metamorphic rocks throughout south part of quadrangle, and as (unmapped) dikes in Cretaceous granite along south edge of quadrangle

Kg GRANITE OF PIPE SPRING (CRETACEOUS)--Named for Pipe Spring in southeast corner of quadrangle. Light-gray to very pale buff coarse-grained granite; present along south edge of quadrangle as part of a large mass of granite to the south, and as a small stock and associated smaller bodies 4 km south-southeast of Manhattan. About 80 m.y. old

Kgp PORPHYRITIC FACIES OF GRANITE OF SHOSHONE PEAK (CRETACEOUS)--Named for Shoshone Peak east of Round Mountain quadrangle. Light-gray to very pale buff porphyritic coarse-grained granite; characterized by large (5 cm) orthoclase phenocrysts; present in northeast corner of quadrangle. About 95 m.y. old

Pd DIABLO FORMATION (LOWER PERMIAN)--Olive-brown to gray argillite, siltstone, sandstone, and conglomerate. Conglomerate fragments (up to 4 cm diameter) tend to be angular and lensoid, consist of black and gray chert, fine-grained quartzite, slate, gray limestone and dolomite, and fine-grained volcanic rocks. Present as large slab in megabreccia of Sloppy Gulch (Tsp) 1.5 km north of Manhattan and as small fragments (unmapped) in megabreccia of Sloppy Gulch 3 km east of Manhattan

Pzd TOQUIMA FORMATION (ORDOVICIAN)--Forms thrust plate overlying Ordovician(?) Zanzibar Limestone and underlying Lower Cambrian schist, argillite, siltstone, sandstone, and limestone

Otl Limestone--Gray to light-gray, laminated; locally argillaceous; present in southwest part of quadrangle

Otlj Jaspertized or silicified

Otlc Buff and calc-silicated

Otd Dolomite--Light-gray, fine-grained, thin-bedded, laminated; interlayered with limestone; present in southwest corner of quadrangle

Ots Shale--Gray, somewhat phyllitic, or flastle; locally contains abundant graptolites of early Caradoc (Middle Ordovician) age; interlayered locally with quartzite and limestone beds; present in southwest part of quadrangle

Otq Quartzite--Gray, fine-grained; locally bleached white or very pale buff; present in southwest part of quadrangle

Pz d DOLOMITE (ORDOVICIAN?)--Light-gray thin-bedded dolomite; similar to dolomite of Toquima Formation with which it probably correlates; present east of Salisbury Peak

Pz q QUARTZITE (ORDOVICIAN?)--Buff, locally gray, fine-grained quartzite; except for dominant buff color, similar to quartzite of Toquima Formation with which it probably correlates; present in east-trending band 0.5-1.5 km wide east of Manhattan

ZANZIBAR LIMESTONE (ORDOVICIAN?)--Forms thrust plate overlying Ordovician(?) Mayflower Schist and Cambrian Gold Hill Formation and underlying Ordovician Toquima Formation

Oza Argillite--Gray to dark-gray, noncalcareous to limy; locally faintly laminated or phyllitic; interlayered with limestone and dominant in upper part of formation; present in southwest part of quadrangle

Ozaj Jaspertized or silicified

Ozl Limestone--Gray to light-gray, laminated; locally contains cherty layers; interlayered with argillite and dominant in lower part of formation; present in south part of quadrangle

Ozlj Jaspertized or silicified

Ozlc Calc-silicated--Pale-greenish-gray to buff, some almost white

Pz a ARGILLITE (ORDOVICIAN?)--Gray to dark-gray argillite; locally fatetly laminated or phyllitic; interlayered with limestone, quartzite, schist, and dolomite; similar to argillite of Zanzibar limestone with which it probably correlates; some siliceous gray argillite may correlate with shale of Toquima Formation; present east of Manhattan in east-trending band 0.5-1.5 km wide

Pz l LIMESTONE (ORDOVICIAN?)--Gray to light-gray laminated limestone; interlayered with argillite, quartzite, schist, and dolomite; similar to limestone of Zanzibar Limestone and Toquima Formation with which parts probably correlate; present in east-trending band 0.5-1.5 km wide east of Manhattan caldera

Pz lj Jaspertized or silicified

Pz lc Calc-silicated--Pale greenish gray to buff, some almost white, as along south margin of Manhattan caldera

6s SCHIST AND PHYLLITE (CAMBRIAN)--Gray to olive-brown micaceous schist to phyllitic argillite; interlayered with siliceous argillite, and minor limestone, siltstone, sandstone, and quartzite, which form thrust plate above Ordovician Toquima formation and Ordovician(?) Zanzibar Limestone; locally near west-central edge of quadrangle argillite contains abundant Salterella of Early Cambrian age; present in southwest part of quadrangle

6a SILICEOUS ARGILLITE (CAMBRIAN?)--Brown to dark-brown and gray siliceous argillite; present in southwest part of quadrangle

6l LIMESTONE (CAMBRIAN?)--Gray to dark-brownish-gray laminated thin-bedded limestone and silty limestone; present in southwest part of quadrangle

6ss SANDSTONE, SILTSTONE, AND QUARTZITE (CAMBRIAN?)--Yellowish-brown and light-brown to brown, platy to thin-bedded sandstone, siltstone, and quartzite, and limy sandstone and siltstone, in part interbedded with thin-bedded limestone; present in southwest part of quadrangle

Pz st SILTSTONE (CAMBRIAN?)--Brown siltstone forming large block in megabreccia of Sloppy Gulch (Tsp) 3 km northwest of Manhattan; probably correlates with siltstone of Cambrian(?) sandstone, siltstone, and quartzite unit (6ss)

6ms MAYFLOWER SCHIST (ORDOVICIAN?)--Gray to olive-gray knotted (chlorite(?)) schist; underlies thrust plate of Ordovician(?) Zanzibar Limestone and is in high-angle fault contact with adjacent Cambrian Gold Hill Formation; present in south part of quadrangle

6ml Limestone layer--Gray, thin-bedded thin layer crops out 3 km southeast of Manhattan

Pzs SCHIST (CAMBRIAN?)--Gray to olive-gray knotted (chlorite(?)) schist similar to Mayflower Schist with which it probably correlates; in uncertain structural relation with adjacent rocks; present in east-trending band 0.5-1.5 km wide east of Manhattan

GOLD HILL FORMATION (CAMBRIAN?)--Uncertain structural relation with adjacent rocks: overthrust by Ordovician(?) Zanzibar Limestone west of Manhattan; in fault contact along steeply south-dipping fault against Ordovician(?) Mayflower Schist south and southeast of Manhattan; and appears to be either in high-angle fault contact with, or is overthrust by, or itself overthrusts, Ordovician(?) rocks east of Manhattan

6gq Quartzite--Buff to light-olive-brown mostly fine grained, in part coarse-grained; present in south part of quadrangle

6gs Schist--Light-olive-brown to buff phyllitic argillite to mica schist; as mapped contains some thin beds of quartzite, limy argillite, and calc-silicated limestone; present in south part of quadrangle; schist and quartzite are gold mineralized on Gold Hill southeast of Manhattan

6gl Limestone--Buff and light-brownish-gray to gray, massive to thin-bedded to laminated; pinkish-buff, pale-greenish-gray, and nearly white calc-silicated limestone and white marble (not mapped); interbedded with schist or phyllitic argillite; present in south part of quadrangle; contains vein and replacement deposits of native gold, and arsenic, antimony, and mercury minerals in east part of Manhattan district

6gd Dolomite--Brown; present on Mustang Hill and 2 km southeast of Manhattan

? Queried symbol on map indicates unit of uncertain identity

CONTACT

FAULT, SHOWING DIP--Bar and ball on downthrown side; arrows show strike-slip movement; dotted where concealed, or showing traces of lineaments (mostly north striking) mapped in alluvium

LOW-ANGLE FAULT--Sawteeth on upper plate; dotted where concealed; queried where uncertain

JOINT--Fracture displaying no perceptible offset; grades into fault with only slight offset

STRIKE AND DIP OF BEDS--Attitude not measured; many measured attitudes not shown

VEIN--Mineralized where dots are shown; locally barren quartz (qtz)

SAMPLE LOCALITY OR DATA POINT

SHAFT

ADIT

X PROSPECT

APPROXIMATE OUTLINE OF MILLSITE--1980

TRENCH OR OPEN PIT

REFERENCE

Ferguson, H. G., 1924, Geology and ore deposits of the Manhattan district, Nevada: U.S. Geological Survey Bulletin 723, 163 p.