U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

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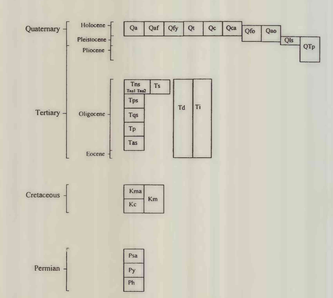
CORRELATION CHART



Bases from U.S. Geological Survey 1975. Cornudas Mtn, Alamo Mtn, McVeigh Hills, 1:24,000 quadrangles. 1927 North American datum.

Geology by Constance J. Nutt and J. Michael O'Neill 1976–1977

SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

UTM GRID AND 1976 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

QUADRANGLE LOCATION

GEOLOGIC MAP OF THE CORNUDAS MOUNTAINS, NEW MEXICO

By

Constance J. Nutt and J. Michael O'Neill

1997

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS

Qa **Stream floodplain alluvium (Holocene)**—Sand, silt, and clay deposited in broad, open stream valleys, in confined ephemeral stream channels, and in areas where drainage is partly blocked by man-made earthen dams. Where exposed, consists of upper 1 ½ to 2 feet (0.5 to 0.6 m) of tan-brown clay-and silt-rich sand enclosing floating pebbles; a medial 1-foot-thick (0.3 m) zone of silty sand interlayered with yellow-white 2 to 4 inch-thick (5.1 to 10.2 cm) layers of calcite-cemented sand, silt, and clay, and a lower zone of unknown thickness consisting of clay, silt, and sand enclosing clasts ranging in size from pebbles to small boulders. Maximum exposed thickness about 10 feet (0.3 m) thick

Qaf **Alluvial and fluvial deposits (Holocene)**—Sand, silt, clay, and pebble to cobble gravel deposited in narrow stream channels and on broad alluvial slopes at the base of low hills and mountain fronts. Generally less than 15 feet (4.6 m) thick

Qfy **Young alluvial fan deposits (Holocene)**—Poorly sorted silty sand and gravel deposited in small alluvial fans along valley margins and around hills and mountains. Maximum thickness unknown

Qt **Talus deposits (Holocene)**—Unsorted, unstratified angular pebbles to boulders up to 30 feet (9.2 m) across; covers flanks of steep slopes of hills and mountains underlain by resistant bedrock

Qc **Colluvium (Holocene)**—Weakly to strongly cemented calcite soil developed in residual deposits of sand, silt, and clay and angular pebbles and cobbles; most commonly mantles the San Andres Formation in the northwestern part of the map area that is drained by tributaries of Shiloh Draw to the north; thickness generally less than 1 to 2 feet (0.3 to 0.6 m)

Qca **Colluvial and alluvial deposits, undivided (Holocene)**—Colluvium (Qc) that is partly reworked and dissected by intermittent streams infilled with young alluvium (Qa), restricted to the south-central part of the map area that is drained by tributaries of the University Draw to the south.

Qfo **Old alluvial fan deposits (Holocene and Pleistocene)**—Poorly sorted silty sand and gravel deposited in abandoned alluvial fans that no longer receive sediment because of incision related to Pleistocene faulting to the east in the Salt Basin graben adjacent to Guadalupe Mountains. Maximum thickness unknown

Qao **Old alluvium (Holocene and Pleistocene)**—Sand, silt, clay, and pebble to cobble gravel preserved as small, isolated hills extending above active stream valley floors

Qls **Landslide deposits (Pleistocene)**—Angular fragments of bedrock mixed with soil or heterogeneous mixtures of boulders and finer grained material derived from adjacent steep hillslopes; characterized by irregular, hummocky topography and numerous closed depressions. Landslides mainly confined to areas underlain by Cretaceous sedimentary rocks preserved adjacent to middle Tertiary igneous intrusions

QTp **Pediment alluvium (Pleistocene and Pliocene?)**—Angular boulder to cobble/gravel set in finer grained matrix and deposited on gently sloping surfaces; preserved as isolated, flat-topped deposits on flanks of Alamo, Black, Flat, and Chatfield Mountains at elevations between 5100 and 5700 feet (1555.5 and 1738.5 m). Appears to be continuous with perched pediment gravels preserved 1 mile east of Chatfield Mountain at elevations near 4900 feet (1494.3 m)

IGNEOUS ROCKS

[Igneous rocks of the Cornudas Mountains have been described by Clabaugh (1941), Zapp (1941), Timm (1941), Barker and others (1977), Barker and Hodges (1977), McLemore and Gallegher 1993), McLemore and others (1996b), and Schreiner, R.A. (1994). The following descriptions are taken from their work. K-Ar age determinations reported below are from Barker and others (1977)

Tns **Nepheline syenite (Oligocene)**—Medium to light-gray, coarse-grained equigranular to slightly porphyritic nepheline syenite. Consists of anorthoclase, nepheline, clinopyroxene, anhedral fayalite rimmed by red hornblende, and minor to trace amounts of biotite, apatite, zircon, and muscovite. Exposures on Wind and Deer Mountains range from weakly to strongly foliated. Wind Mountain unit shown as medium-grained and most suitable for industrial use (Tns) and coarse grained (Tnu) after McLemore and others (1996b). K-Ar age of biotite from Deer Mountain is 31.6 Ma.

Ts **Syenite porphyry (Oligocene)**—Syenite porphyry exposed in the upper parts of Wind Mountains, as mapped by McLemore and others (1996). Fine-grained and consists of potassium-feldspar, albite, aegirine, sodic amphibole, biotite, analcime, and trace amounts of magnetite

Tps **Porphyritic nepheline syenite (Oligocene)**—Dark gray-green, fine- to medium-grained, strongly porphyritic nepheline syenite. Phenocrysts consist of euhedral anorthoclase as much as 1 inch (2.5 cm) long in groundmass of anorthoclase, clinopyroxene, biotite, nepheline, and analcime. Well foliated rock characterize exposures on Black and San Antonio Mountains

Tqs **Quartz-bearing syenite (Oligocene)**—Medium gray, granoblastic to porphyritic syenite composed of tabular, euhedral anorthoclase, subhedral clinopyroxene, biotite, and interstitial quartz. Exposures , restricted to Cornudas Mountain, are weakly foliated. K-Ar age of biotite is 33.9 Ma

Tp **Phonolite (Oligocene)**—Medium gray-green, aphanitic rock composed mainly of alkali feldspar, nepheline, clinopyroxene and riebeckite. Locally contains xenocrysts of olivine, clinopyroxene, and biotite Phonolite of Chatfield, Flat top, and Alamo Mountain shows well developed flow foliation. K-Ar age of biotite from Alamo Mountain is 36 Ma. Tp, on western and southern Alamo Mountain is platy phonolite at a low angle to underlying sedimentary bedding

Tas **Nepheline-bearing augite syenite (Oligocene and Eocene)**—Gray medium grained equigranular nepheline bearing augite syenite. Consists of anorthoclase, plagioclase mantled by anorthoclase, augite, biotite, and interstitial nepheline and analcite. Small body, in part covered by Qaf, in Chess Draw. K-Ar age of biotite is 36.8 Ma

Td **Dike (Oligocene and Eocene)**—Mafic dikes mainly restricted to the Chess Draw area

Ti **Tertiary intrusive, undifferentiated (Oligocene and Eocene)**

SEDIMENTARY ROCKS

[Nomenclature for Permian sedimentary rocks exposed in the Cornudas Mountains follows the terminology used on the New Mexico state map of Anderson and Jones (1994) Anderson and others (1997)]

Kma **Muleros and Mesilla Valley (?) Formations, undivided (Lower Cretaceous)**—Yellowish-tan to light-gray nodular, fossiliferous limestone and minor shale and siltstone (Mulerros) overlain by poorly exposed brownish-tan to orangish-tan sandstone and siltstone (Mesilla Valley). Maximum exposed thickness about 100 feet (30.5 m)

Kc **Campagrande Formation and Cox Sandstone, undivided (Lower Cretaceous)**—Yellowish-orange siltstone and minor cream-white fine-grainedlimestone are the oldest Cretaceous rocks exposed in the map area. Thesexposures, about 15 feet (4.6 m) thick, are restricted to the northwest side ofChatfield Mountain and are similar to rocks described by Kues and Lucas (1993) asthe Campagrande Formation on the southeast flank of Chatfield. Overlyingthe Campagrande at Chatfield and elsewhere resting unconformably on thePermian San Andres Formation is the Cox Sandstone. The Cox Sandstone consists of a basal rounded to angular chert pebble conglomerate overlain by interbedded silty to sandy, light-gray, thin-bedded limestone and orange-tan to reddish-brown to cream-white calcareous, quartz-rich, cross-bedded sandstone, locally, channel-fill deposits of lithic pebble conglomerate are interlayered with sandstone. Maximum thickness near 100 feet (30.5 m)

Km **Metamorphosed calc-silicate rock (Lower Cretaceous)**—Yellow-white to pale green, fine-grained metamorphosed calcareous rock that rests directly on Alamo Mountain sill. Less than 5 feet (1.5 m) thick

Psa **San Andres Formation (Lower Permian)**—Medium gray to light olive gray dolomite and dolomitic limestone and dark gray limestone; fine- to medium-grained, thin- to medium-bedded, and contains medium gray chert nodules and stringers; sandstone shale lenses most abundant in the middle part of the section; dark gray massive limestone restricted to uppermost exposures in map area and are conspicuously fossiliferous. Basal dolomitic limestone is locally pisolitic and vuggy, contains layers rich in fossil hash, included zones of intraformational conglomerate. Maximum exposed thickness is about 500 feet (152.5 m)

Py **Yeso Formation (Lower Permian)**—Interlayered gypsum-rich laminated claystone locally enclosing dark gray gypsum nodules, yellow-white, sugary-textured limestone, coarse-grained gypsum, and red to green shale and claystone, and orange-tan to red and red-brown, medium-grained quartz sandstone. Most exposures are restricted to top of unit where red to green shale directly underlie the strongly resistant San Andreas Formation. Maximum exposed thickness near 100 feet (30.5 m)

Ph **Hueco Formation (Lower Permian)**—Dark gray, fine-grained, thin- to medium-bedded, fossiliferous limestone containing conspicuous dark gray to black chert nodules and stringers. Maximum exposed thickness less than 100 feet (30.5 m)

Contact–Dashed where approximately located, dotted where concealed

Fault–Dashed where approximately located, dotted where concealed bar and ball on downthrown side. Offset in the order of 15 or less feet (4.6 m or less)

Syncline–Dashed where approximately located, dotted where concealed. Synclines formed during intrusion of Tertiary igneous rocks

Anticline–Dashed where approximately located, dotted where concealed. Anticlines formed during intrusion of Tertiary igneous rocks

Strike and dip of bedding–Showing direction and amount of dip

Strike and dip of foliation–Showing direction and amount of dip