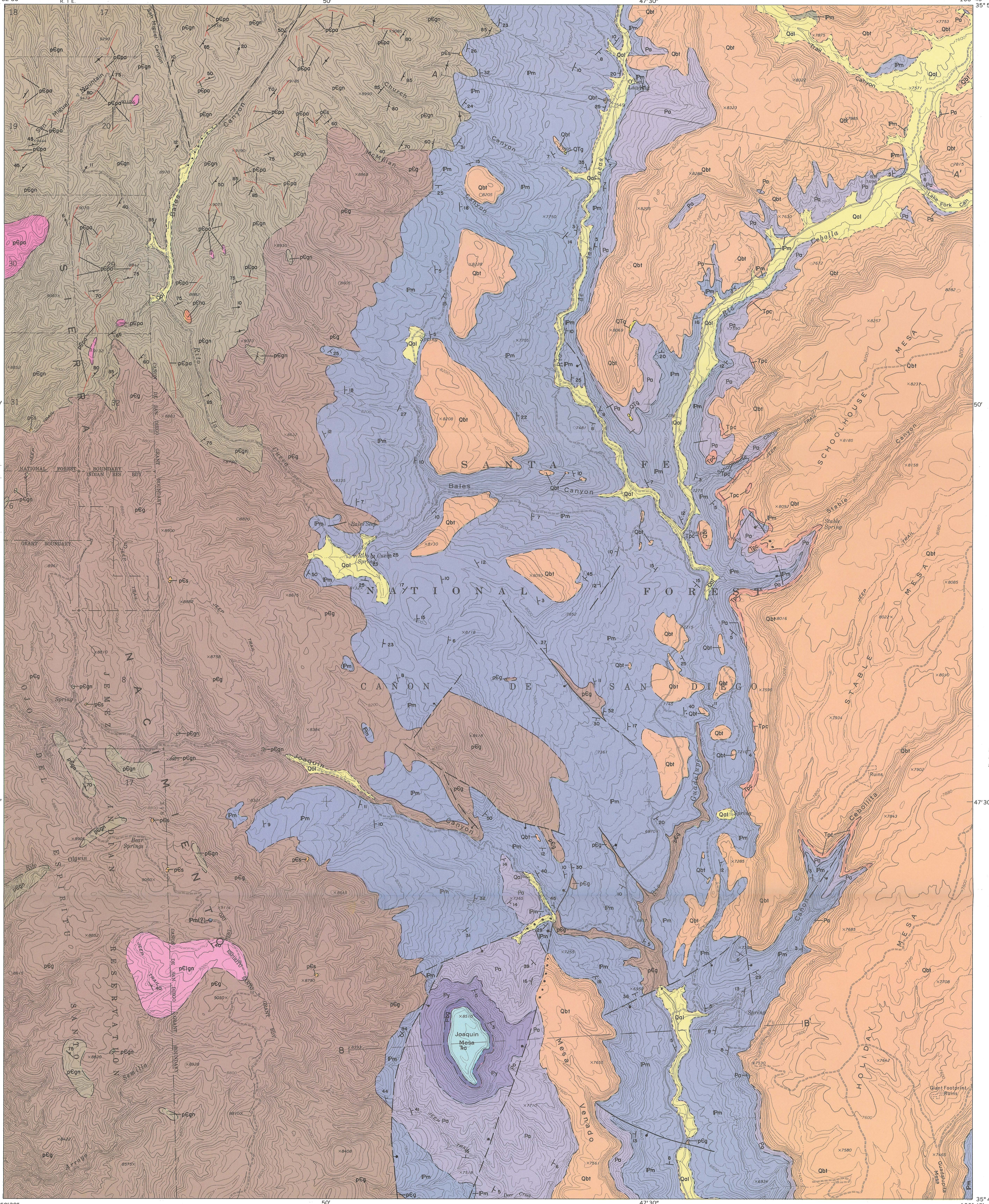


Base from U.S. Geological Survey

Geology by Lee A. Woodward, Harvey R. DuChene, and Richard K. Reed, 1970–73

EXPLANATION

Qal — Alluvium
Clay, silt, sand, and gravel, mostly along valleys, includes some colluvium; to 20(?) ft thick

Qbt — Bandelier Tuff
Nonwelded to densely welded ash-flow deposits consisting of rhyolite and pumice; contains quartz, sanidine, and sparse to abundant inclusions of hornblende-rich quartz-latite pumice and lithic fragments; to 600(?) ft thick

QUATERNARY

QTg — Gravel
Terrace, pediment, and stream gravel with cobbles and boulders mostly of Precambrian rocks; to 10 ft thick

Tpc — Paliza Canyon Formation
Lower part composed of very fine grained, black boulders of basalt and basaltic andesite; overlain by very fine grained, brownish-gray to dark-gray andesite; to 40 ft thick

TERTIARY

Ŧa — Agua Zarca Member of Chinle Formation
White to buff, medium to very coarse grained, very thick bedded sandstone; locally conglomeratic near the base; about 100 ft thick

TRIASSIC

Pbg — Bernal Formation and Glorieta Sandstone undivided
Bernal (upper): reddish-brown, thin-bedded, fine- to coarse-grained, slope-forming sandstone and intercalated siltstone; about 30 ft thick. Glorieta (lower): white to tan, fine- to coarse-grained, thick-bedded sandstone; about 80 ft thick

Py — Yeso Formation
Orange-buff and reddish-brown, even-bedded, fine to very fine grained sandstone; minor amounts of dense, gray-tan carbonate beds near top; 425 ft thick

Pa — Abo Formation
Reddish-brown mudstone and lenticular sandstone and arkose; locally light-gray sandstone, arkose, and minor nodular limestone; 750 to 850 ft thick

PERMIAN

IPm — Madera Formation
Light-gray, commonly fossiliferous, limestone; white to buff orthoquartzite; coarse-grained arkose; reddish- to light-gray shale; arkosic limestone; 400(?) to about 650 ft thick

PENNSYLVANIAN

p€pa — Pegmatite, aplite, and granitic bodies
Dikes and small irregular-shaped plutons of pegmatite, aplite, and granitic rocks; mainly pink alkali feldspar and quartz

p€g — Granite
Pink, medium grained; contains very minor biotite or muscovite; locally may be faintly foliated; locally grades into quartz monzonite; pink microcline megacrysts up to 1 cm in diameter occur at a few localities

p€lgn — Leucogneiss
Light pinkish-gray, fine- to medium-grained, quartzo-feldspathic gneiss with minor biotite

p€gn — Gneiss
Pink to gray, fine- to medium-grained, lenticular, biotite-quartz-feldspar gneiss; moderate to strong northeast-trending foliation; locally includes pink granitic, aplitic, and pegmatitic dikes; contains small inclusions of schistose amphibolite

p€s — Schist
Mostly fine-grained, schistose amphibolite; locally includes fine-grained quartz-mica schist

p€ha — Hornblendite and amphibolite
Core of black, fine-grained hornblendite consisting of hornblende with minor orthopyroxene, biotite, and, rarely, plagioclase; amphibolite forms margin of body and consists of fine-grained hornblende and plagioclase

PRECAMBRIAN

Fault, dashed where approximate, dotted where concealed; ball on downthrown side

Contact of surficial deposit

Bedrock contact, dashed where approximate

Strike and dip of bedding

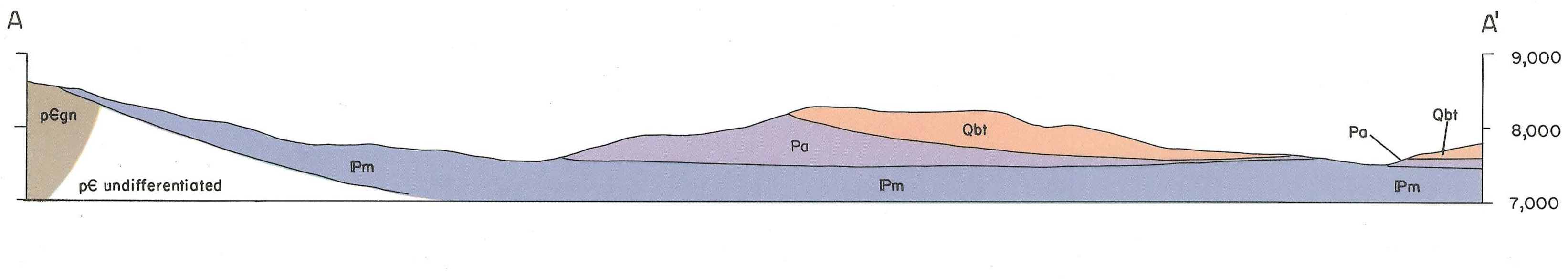
Strike and dip of overturned bedding

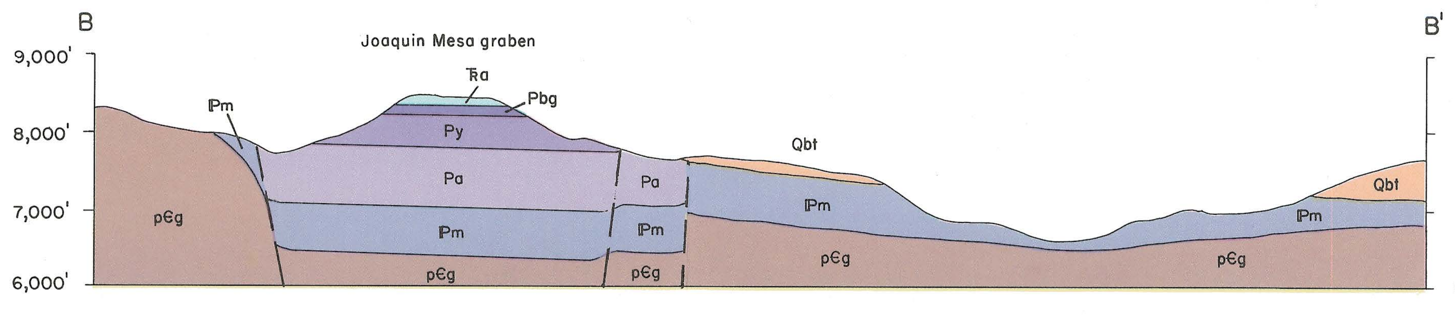
Strike and dip of schistosity or foliation

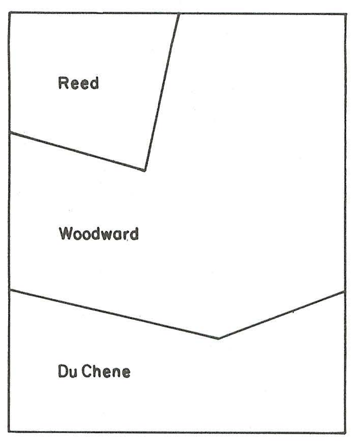
Strike of vertical schistosity or foliation

Bearing and plunge of lineation

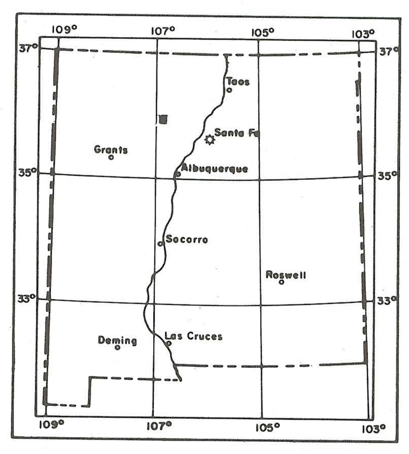
13°00'
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1970







MAPPING RESPONSIBILITIES



INDEX MAP OF NEW MEXICO

GEOLOGIC MAP AND SECTIONS OF SAN MIGUEL MOUNTAIN QUADRANGLE, NEW MEXICO

by Lee A. Woodward, Harvey R. DuChene, and Richard K. Reed, 1974

Scale 1:24,000
0 1 2 Miles

PREVIOUS AND PRESENT WORK

The San Miguel Mountain quadrangle was included in a reconnaissance map by Wood and Northrop (1946). A map by Smith and others (1970) at a scale of 1:125,000 includes the eastern part of the quadrangle; their map concerns mainly the Cenozoic volcanic rocks of the Jemez Mountains and is generalized for the earlier rocks.

Responsibility for mapping this quadrangle is shown on the inset map. Reed mapped the northwestern part at 1:12,000; his map was modified by Woodward and reduced to 1:24,000 scale. The rest of the quadrangle was mapped at 1:24,000. The area south of Joaquin Canyon was mapped by DuChene; the remainder of the quadrangle by Woodward.

ROCK UNITS

The oldest rocks in the quadrangle are the hornblendite-amphibolite body *(p€ha)* and the small bodies of schist *(p€s)*. Both these rock bodies are older than the biotite-quartz-feldspar gneiss *(p€gn)* inasmuch as they occur as inclusions within the gneiss. Leucogneiss *(p€lgn)* and biotite-quartz-feldspar gneiss are both older than the granite *(p€g)*, but their relationship to each other is not clear. Dikes and irregularly shaped aplite, pegmatite, and granitic bodies *(p€pa)* cut all the other crystalline rocks and are, therefore, the youngest of the Precambrian rocks.

The Madera Formation (*IPm*) may locally include at the base a few inches to a few feet of either the Log Springs Formation or the Sandia Formation. The Log Springs Formation, tentatively considered Morrow age (Armstrong, 1955, p. 5), consists of deep-red, ferruginous sandstone and shale. The Sandia Formation consists of dark shale and buff sandstone of Morrow to Lampasas age (Wood and Northrop, 1946).

Thin gravel deposits with Precambrian boulders and cobbles are locally present beneath the Bandelier Tuff *(Qbt)*, but at many localities these gravel units are too limited to be shown on the map.

Some outcrops of the Bandelier Tuff may actually be landslide deposits composed of the Tuff. The Bandelier was deposited on a surface having several hundred feet of relief, therefore may occur at low elevations either as initial deposits or as later landslides; in the absence of a well-exposed base, and with the presence of rubble, the distinction is very difficult. The Bandelier Tuff was mapped as one unit although Smith and others (1970) have distinguished two members.

STRUCTURE

Precambrian Deformation

The oldest episode of deformation clearly seen in this quadrangle is the synkinematic metamorphism of the schist *(p€s)* bodies which occur as inclusions within the biotite-quartz-feldspar gneiss *(p€gn)*. The hornblendite-amphibolite *(p€ha)* also appears to be older than the gneiss, but the earlier history of the hornblendite-amphibolite body is not known.

Biotite-quartz-feldspar gneiss was probably emplaced as an allochthonous pluton, although the precise mechanisms of emplacement are not clear. This pluton was later regionally metamorphosed, and developed a strong northeast-trending foliation. Pink granite *(p€g)* was later intruded into the gneiss and appears to have partially stoped and assimilated the biotite-quartz-feldspar gneiss.

The youngest Precambrian rocks, the aplite, pegmatite, and granitic dikes *(p€pa)* were emplaced by dilation.

Cenozoic Deformation

This quadrangle covers the east-central part of the Nacimiento uplift which trends north, is about 50 miles long, and is 6 to 10 miles wide. Uplift began in the early Tertiary and probably continued episodically into the middle or late Tertiary. The eastern part of the uplift is unconformably covered by Tertiary and Quaternary extrusive rocks derived from the Jemez volcanic center to the east (Smith and others, 1970).

The principal structural feature is the eastward-dipping east flank of the Nacimiento uplift (structure section *A-A'*). Lesser structures include high-angle faults that appear to have formed during uplift and prior to extrusion of the Cenozoic volcanic rocks. Development of the Joaquin Mesa graben (structure section *B-B'*), a keystone block, was probably caused by arching of the uplift with resultant horizontal tension.

The arcuate fault along Rio de las Vacas about 1.3 miles north of Porter is a curved slip surface along which the block to the west slid downhill and rotated. Sliding under the influence of gravity probably occurred as Rio de las Vacas was incised into the Madera Formation.

GROUND WATER

Many of the small, gravel-filled valleys that head in the high areas of Precambrian rocks in the western part of the quadrangle are potential sources of shallow ground water.

Unconsolidated ash-flow deposits locally present at the base of the Bandelier Tuff are aquifers that may yield small amounts of water. This horizon is commonly marked at the outcrop by small springs and seeps.

REFERENCES

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Wood, G. H. and Northrop, S. A., 1946, Geology of the Nacimiento Mountains, San Pedro Mountain, and adjacent plateaus in parts of Sandoval and Rio Arriba Counties, New Mexico: U. S. Geol. Survey Oil and Gas Inv. Prelim. Map 57.