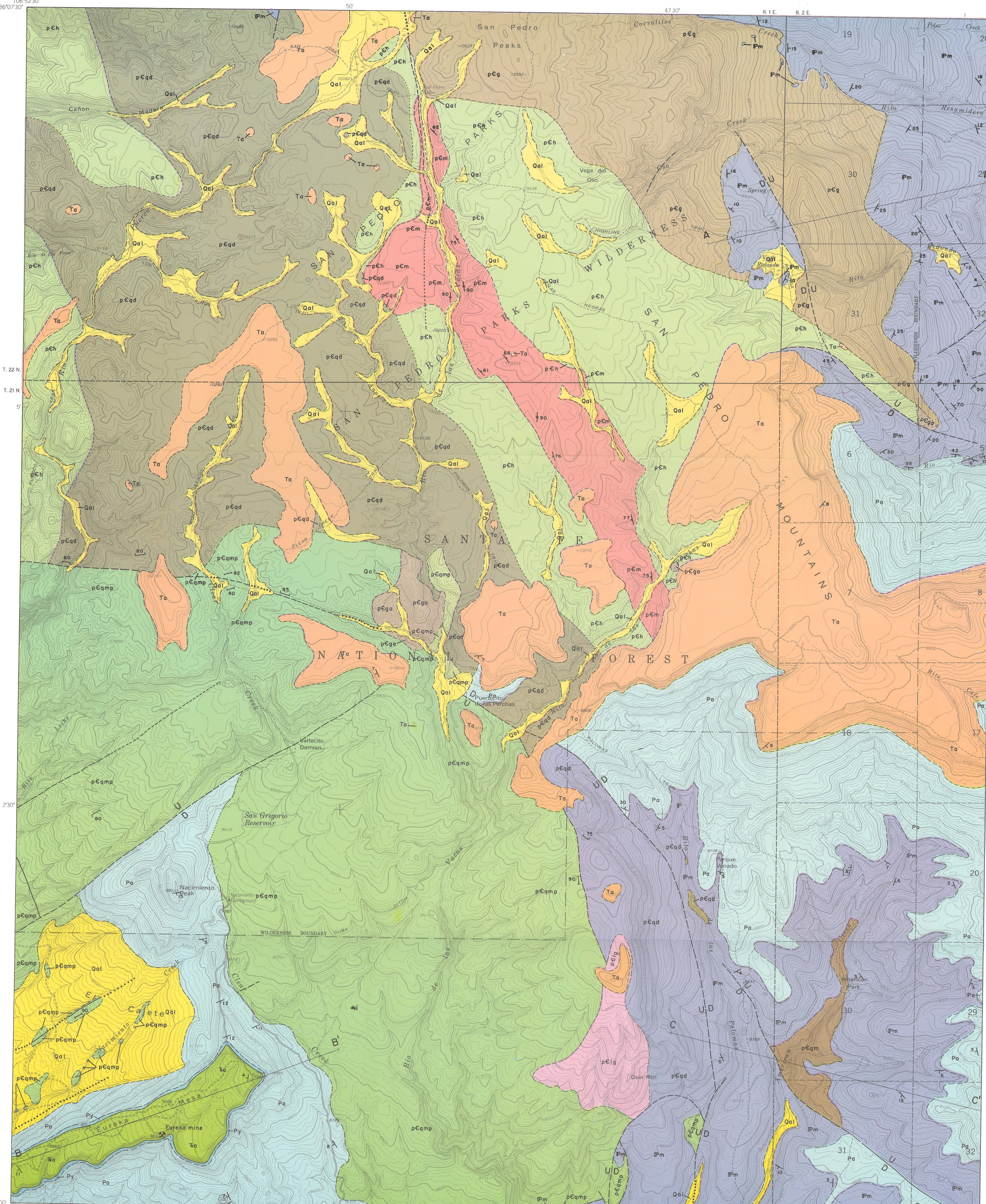


Base from U.S. Geological Survey

Geology by Lee A. Woodward, Douglas McLelland, and William H. Kaufman, 1970, 1971, and 1972

EXPLANATION

Qal — **Alluvium** — QUATERNARY

Clay, silt, sand, and gravel; includes some colluvium; 0 to 30(?) ft thick

Ta — **Abiquiu Formation** — TERTIARY

Lower member: sandstone, conglomeratic sandstone, tuffaceous sandstone, and conglomerate; 0 to 200 ft thick. Upper Pedernal Chert Member: white to bluish-gray chert with local red, yellow, and brown mottling; 0 to 20(?) ft thick

Ћa — **Agua Zarca Member of Chinle Formation** — TRIASSIC

White to light-buff, very thick bedded, fine- to coarse-grained quartzose sandstone, conglomerate, and conglomeratic sandstone; 80 to 140 ft thick

PERMIAN

Py — **Yeso Formation**

Tan-brown and orange-buff, even-bedded, fine- to very fine-grained sandstone; 20(?) to 60 ft thick

Pa — **Abo Formation**

Reddish-brown mudstone and lenticular sandstone and arkose; locally light-gray sandstone, arkose, and minor limestone; 200(?) to 800(?) ft thick

IPm — **Madera Formation** — PENNSYLVANIAN

Light-gray, commonly fossiliferous, limestone; white to buff and reddish orthoquartzite; pink arkose; reddish to light-gray shale; arkosic limestone; 0 to 500(?) ft thick

PRECAMBRIAN

p€lg — **Leucogranite**

Pink-weathering, fine-grained; consists of microcline, quartz, sodic plagioclase, and minor biotite; contains numerous xenocrysts up to 1 cm long of blue-gray quartz and milky white plagioclase derived from the quartz monzonite host

p€g — **Muscovite-biotite granite**

Pink-weathering, weakly porphyritic; contains elongate megacrysts of pink microcline widely scattered in medium-grained groundmass of smoky quartz, pink microcline, and sodic plagioclase; contains accessory muscovite and biotite; locally contains small, irregular-shaped bodies of simple pegmatite; has fine-grained, aplitic textured border facies along the southwest margin of the pluton

p€qmp, **p€qm** — **Quartz monzonite**

p€qmp *Buff- to gray-weathering; has rapakivi texture with large euhedral and rounded megacrysts of microcline, locally mantled by sodic plagioclase, in medium- to coarse-grained groundmass of blue-gray quartz, pink microcline, sodic plagioclase and accessory biotite; locally equigranular; contains scattered dikes of aplite, lamprophyre, and simple pegmatite*

p€qm *Pink, medium-grained, equigranular; composed of oligoclase, microcline, and quartz with subordinate biotite; occurs only along American Creek; may be equivalent to p€qmp*

p€h — **Hybrid zone**

Numerous irregular-shaped bodies of quartz diorite and pink hyprid porphyry that consists of small (up to 5 mm long) quartz and milky-white plagioclase megacrysts in fine-grained groundmass of microcline, quartz, sodic plagioclase and minor biotite; contacts between hybrid zone rocks and quartz diorite are broadly gradational

p€qd — **Quartz diorite**

Gray- to buff-weathering, medium-grained, equigranular; composed of milky-white plagioclase, blue-gray quartz, and accessory biotite, hornblende and pink microcline; locally granodioritic, particularly in many areas adjacent to the quartz monzonite (p€qmp) where quartz diorite (p€qd) contains numerous large, pink microcline megacrysts

p€ga — **Hornblende gabbro and diorite**

Dark-gray-weathering, fine- to medium-grained; composed of plagioclase and hornblende with minor pyroxene, biotite, and quartz; locally hybridized adjacent to contacts with younger plutonic rocks

p€m — **Metavolcanics**

Greenish-gray, buff- or pink-weathering; contains porphyroclasts of gray quartz, 1 to 2 mm in diameter in very fine-grained granoblastic aggregate of microcline, quartz, sodic plagioclase and minor biotite; weak foliation marked by biotite-rich layers

U/D **Fault**

Long dashes where approximate, short dashes where inferred, dotted where concealed; U, up, D, down

Contact

Long dashes where approximate, short dashes where gradational

15 *Strike and dip of bedding*

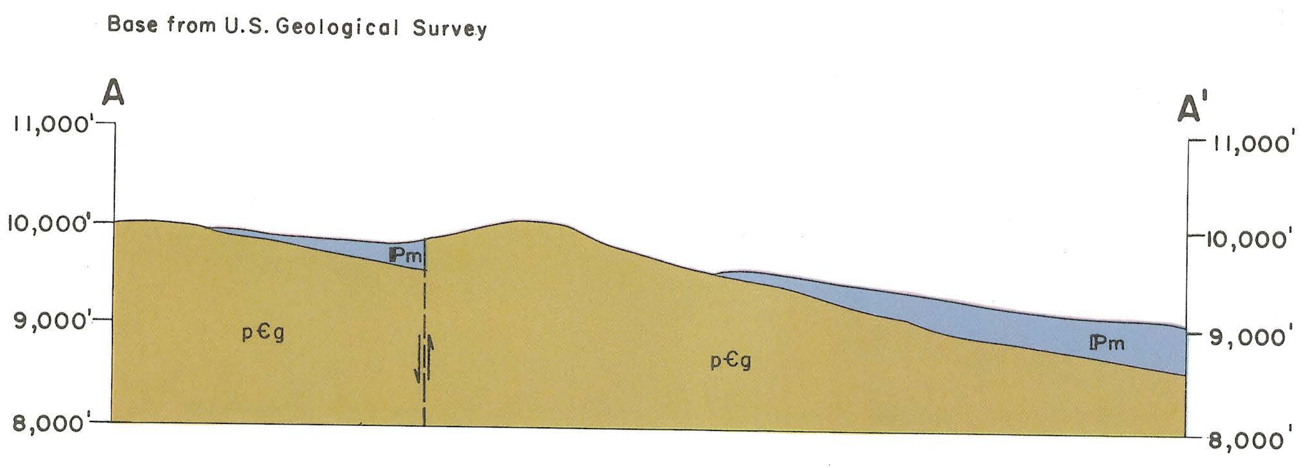
60 *Strike and dip of schistosity of foliation*

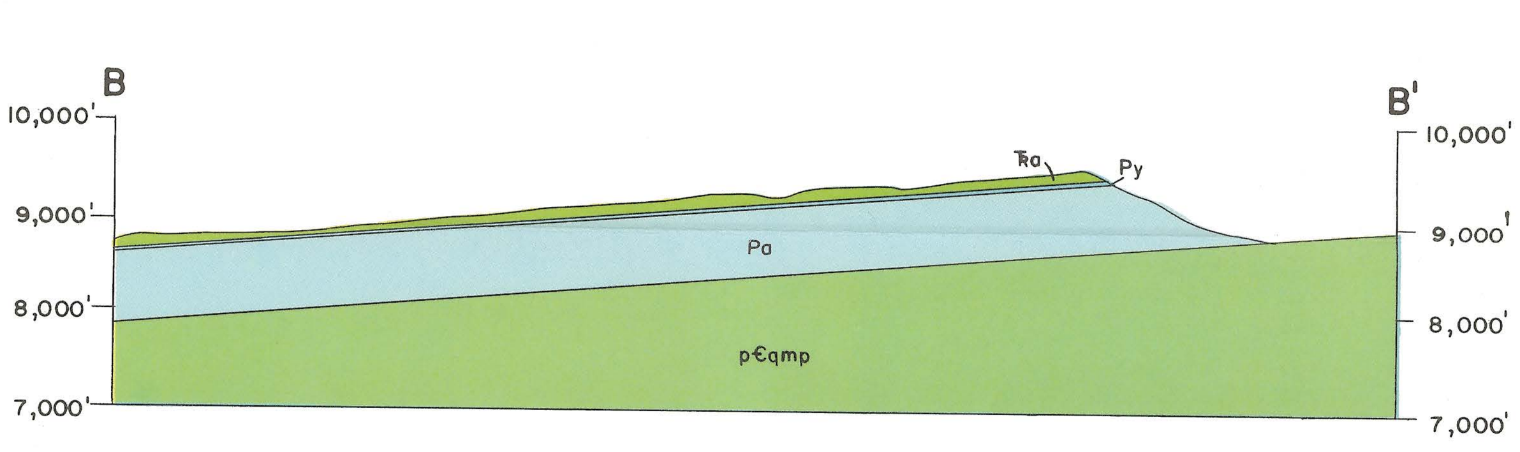
90 *Strike of vertical schistosity or foliation*

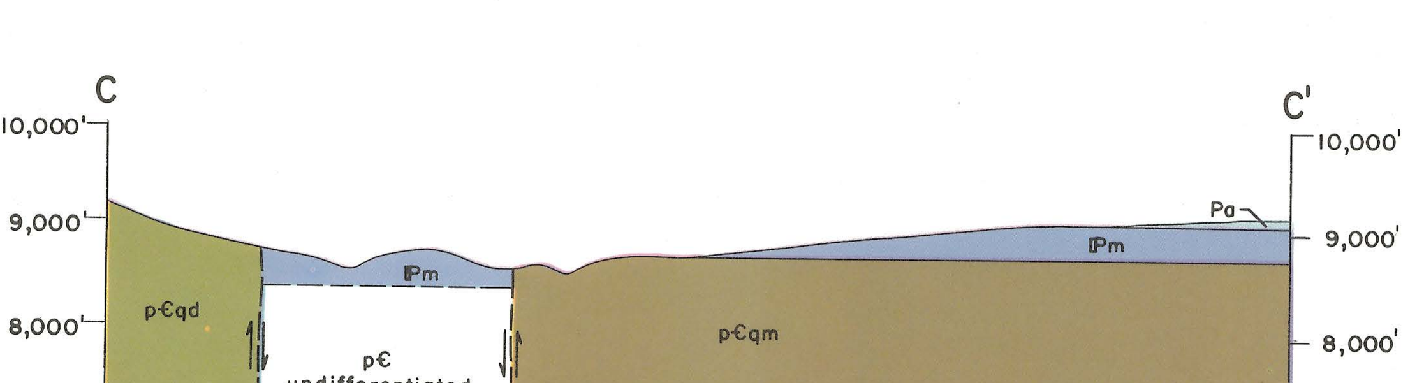
Mine or prospect

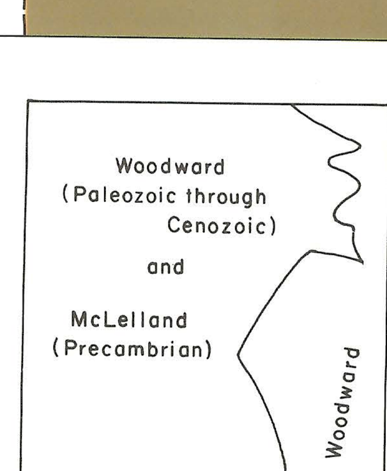
50 *Strike and dip of shear fracture*

90 *Strike of vertical fracture*









Mapping Responsibility

PREVIOUS WORK

A generalized map showing the distribution of the Pedernal Chert Member of the Abiquiu Formation was published by Church and Hack (1939). Nacimiento Peak quadrangle was included in a reconnaissance map of the Nacimiento Mountains and adjacent areas by Wood and Northrop (1946).

STRATIGRAPHY

The crystalline rocks are assigned to the Precambrian because the only known pre-Pennsylvanian igneous and metamorphic events in this region are radiometrically dated as Precambrian (Muehlberger and others, 1967). Suggested relative ages of the crystalline rocks are shown in the *explanation*; a detailed report containing radiometric and structural evidence is being prepared by McLelland (1973).

The Madera Formation (Pennsylvanian) is absent in the western part of the quadrangle where the Abo Formation (Permian) rests directly on the Precambrian.

The lower clastic member of the Abiquiu Formation thins westward and is locally missing where the Pedernal Chert Member (Church and Hack, 1939) lies unconformably on the older rocks. The chert is extremely resistant and locally forms lag deposits; the contacts of the chert are, therefore, approximate at most localities.

STRUCTURE

Precambrian Deformation

The earliest deformational event that can be recognized is regional synkinematic metamorphism of the metavolcanics. Later cataclastic deformation was confined to narrow, steeply dipping zones marked by closely spaced shear fractures or flaser structure and mylonite. Many of these zones appear to have been reactivated during later Tertiary deformation. Faults in the crystalline rocks which are marked by brecciation are assumed to have resulted solely from Tertiary deformation.

The crystalline rocks are listed in their apparent chronologic order in the *explanation.*

Paleozoic Deformation

In the western part of the quadrangle the Madera Formation (Pennsylvanian) is absent and Permian rocks (Abo Formation) lie directly on the Precambrian. Isopach maps by Wood and Northrop (1946) show that this part of the Nacimiento area was positive during Pennsylvanian time and continued to show positive tendencies during Permian time, as evidenced by thinner strata here than in adjacent areas.

Cenozoic Deformation

This quadrangle covers the central-northern part of the Nacimiento uplift which trends north, is about 50 miles long, and is 6 to 10 miles wide. The structurally highest part of the uplift occurs in this quadrangle where the principal structural feature is a dome elongated north-south with high-angle faults along the margins.

Uplift began in the early Tertiary (Woodward and others, 1972) and continued into the middle Tertiary, as evidenced by tilting of the Abiquiu Formation (Church and Hack, 1939) of probable Miocene age (Smith, 1938). Many of the high-angle faults appear to be older than the Abiquiu Formation and probably formed during early development of the uplift.

ECONOMIC GEOLOGY

The Eureka mine, on the south side of Eureka Mesa, occurs in the lower part of the Agua Zarca Member of the Chinle Formation (Triassic). Ore minerals consist mainly of chalcocite, bornite, malachite, and minor azurite. Ore deposition occurred in a paleochannel complex; copper sulfides replaced carbonaceous plant material and were later partly oxidized to form malachite and azurite now found in the interstices of the host sandstone. Assay results of a mineralized fossil log show that it contains 38.9 percent copper and 6.42 oz/ton silver (Kaufman, 1971). A more detailed discussion of the localization and genesis of the ore and guides for exploration have been presented by Kaufman and others (1972).

Evidence of commercial mineralization elsewhere in the quadrangle was not found.

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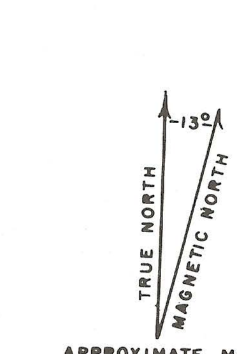
INDEX MAP OF NEW MEXICO



APPROXIMATE MEAN DECLINATION 1970

GEOLOGIC MAP AND SECTIONS OF NACIMIENTO PEAK QUADRANGLE NEW MEXICO

by Lee A. Woodward, Douglas McLelland, and William H. Kaufman

1974

Scale 1:24,000

0 1 2 Miles