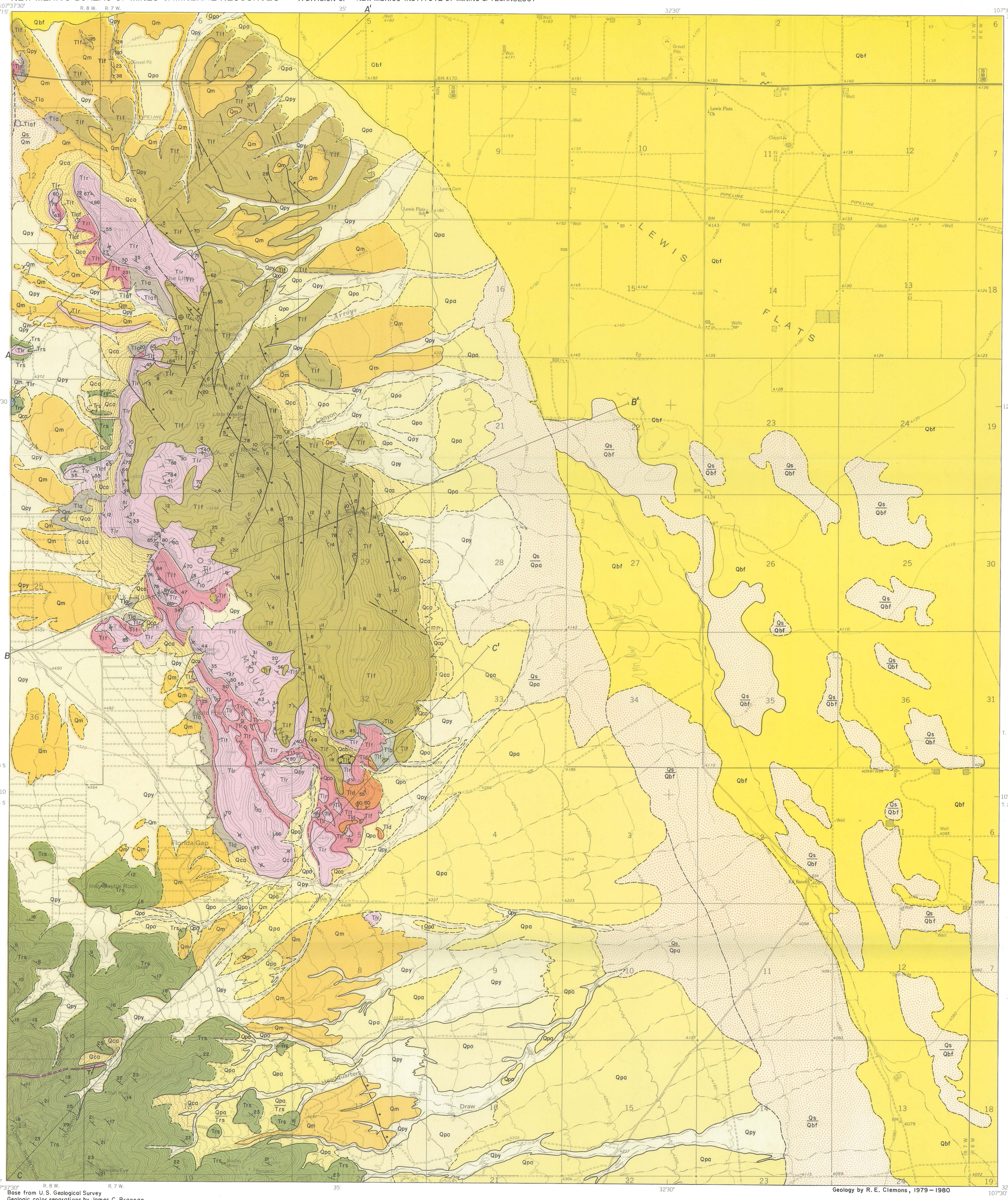
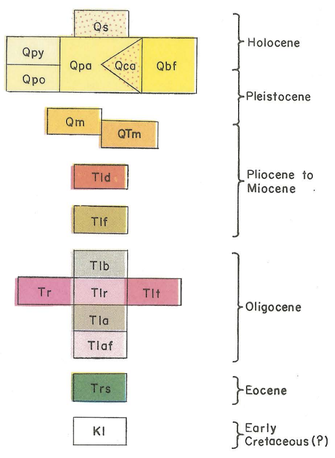
NEW MEXICO BUREAU OF MINES & MINERAL RESOURCES A DIVISION OF NEW MEXICO INSTITUTE OF MINING & TECHNOLOGY



Base from U.S. Geological Survey
Geologic color separations by James C. Brannan

Geology by R. E. Clemons, 1979–1980

CORRELATION OF MAP UNITS



DESCRIPTION OF ROCK UNITS

Qs Windblown sand—*Unconsolidated dunes up to 10 ft high; mostly underlain by caliche horizon; forms cover over map unit shown by symbol under the line (for example, Qs/Qbf)*

Qbf Basin-floor sediments—*Predominantly nongravelly to slightly gravelly alluvium in the Mimbres Basin unaffected by arroyo incision; main part of unit appears to grade to Qpo unit in piedmont toeslopes*

Qca Undifferentiated colluvium-alluvium—*Thin, talus-slope veneers and colluvial and alluvial fills on arroyo-valley sideslopes; found in mountain canyons and on piedmont slopes*

Qpa Undifferentiated piedmont-slope alluvium—*Complexly intermixed, older piedmont-slope alluvium and younger piedmont-slope alluvium (Qpo and Qpy)*

Qpy Younger piedmont-slope arroyo alluvium—*Fills (silty to gravelly) of shallow drainageways cut below older fan and erosion surfaces graded to closed basins*

Qpo Older piedmont-slope alluvium—*Unconsolidated fan deposits, piedmont-valley fills, and erosion-surface veneers, associated with surfaces graded to closed basins; uppermost beds often cemented with pedogenic carbonate*

Qm Mimbres formation—*Fan gravel and interbedded, sandy lenses representing piedmont-slope facies; includes thin, erosion-surface veneers near mountain fronts; upper layers contain carbonate accumulations (caliche) up to several feet thick; thickness to 100 ft*

QTm Mimbres formation—*Similar to Qm but found on higher terrace remnants; igneous rock clasts are much more intensely weathered; thickness to 200 ft; not exposed in Florida Gap quadrangle but probably is partly equivalent to Qm in cross sections; excellent exposure occurs in Lobo Draw approximately 1 mi south*

Tld Dacite of Little Florida Mountains—*Grayish-red to dusky-red intrusive; microcrystalline to partly glassy, nonporphyritic*

Tlf Fanglomerate of Little Florida Mountains—*Dark reddish-brown, rhyolite-boulder breccias, sandy and muddy conglomerates, and conglomeratic sandstones; lower, coarser beds are well indurated; upper, finer beds moderately indurated; fault zones cutting these strata contain manganese, barite, and fluorite veins; estimated thickness approximately 2,000 ft*

Tlb Basaltic-andesite flow(s)—*Dark reddish-brown to black, vesicular and amygdaloidal flows; hydrothermally altered; plagioclase laths in an intersertal matrix; only exposed at southeast end of Little Florida Mountains*

Tlr Rhyolite of Little Florida Mountains—*Irregular, domal to dike-like intrusions and short flows of pale-red to dark grayish-red, flow-banded rhyolite; much of unit has a distinctive autobreccia texture, phenocrysts are very rare; unit forms bold cliffs along western side of the range*

Tlt Rhyolite tuff of Little Florida Mountains—*Pale-greenish to orange-gray, lithic tuff and minor, interbedded, volcaniclastic mudstone and sandstone; poorly indurated and poorly exposed in small slope gullies; black perlitic obsidian occurring as outer zones of rhyolite intrusions is included in this unit because of similar slope-forming character; unit includes much hydrothermally altered rock in southern end of the Little Florida Mountains*

Tr Rhyolite dikes in Florida Mountains—*White dikes ranging from 6 to 18 ft thick; holocrystalline, non-porphyritic; fractures commonly stained with manganese oxides*

Tlaf Ash-flow tuff—*Grayish-pink, vitric-crystal to crystal-vitric ash-flow tuff; contains 7–30 percent phenocrysts of plagioclase, sanidine, quartz, biotite, and sparse hornblende and sphene; abundant, white, flattened pumice fragments in outcrops west of The Little Gap; small rock fragments common in outcrop 1 mi north of Rock Hound State Park; thickness to 300 ft*

Tla Andesite of Little Florida Mountains—*Undifferentiated flows and intrusives of medium-gray to brownish-gray andesite to dacite; finely crystalline, non-porphyritic, hyalopilitic, pilotaxitic texture; provisionally correlated with Rubio Peak Formation in the southern Cooke's Range*

Trs Starvation Draw member of Rubio Peak Formation—*Grayish-purple and reddish breccias of polylithic volcanic clasts grading upward into greenish-gray breccias and conglomeratic sandstones; basal beds contain abundant granite and limestone clasts; upper beds are volcanic arenites with abundant epidote concretions; whole section is strongly propylitized; thickness to approximately 1,600 ft*

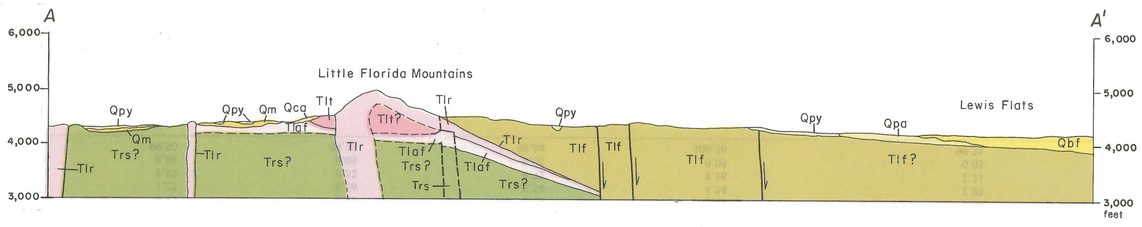
Kl Lobo Formation—*Interbedded, reddish shale and nodular, shaly limestone, gray siltstone, sandstone, and pebble to cobble conglomerates; this unit is Darton's (1916) Lobo Formation: not exposed in Florida Gap quadrangle, but underlies Trs in cross section C-C′ and crops out just west and south of southwest corner of quadrangle; thickness to approximately 500 ft*

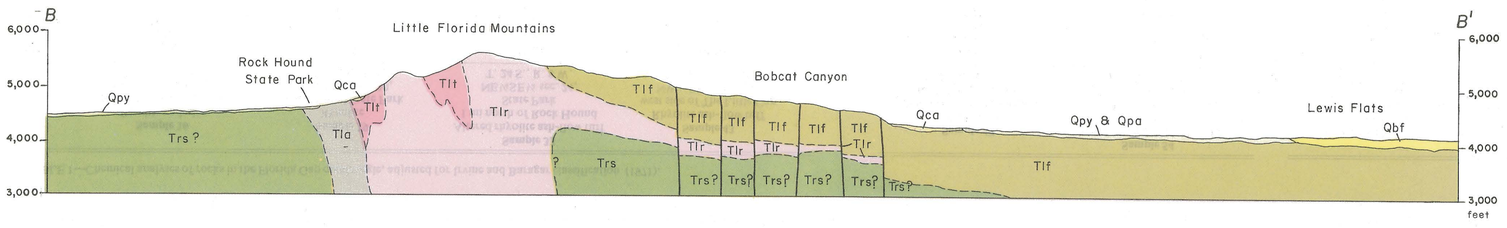
Om Montoya Group—*Basal, coarse sandy dolomite (Cable Canyon) overlain by dark-brown, coarse crystalline dolomite (Upham); upper part of section consists of thin-bedded, medium-gray limestone and cherty limestone (Aleman); maximum thickness approximately 140 ft; not exposed in Florida Gap quadrangle, but underlies Kl in cross section C-C′ and crops out on west slope of Capitol Dome*

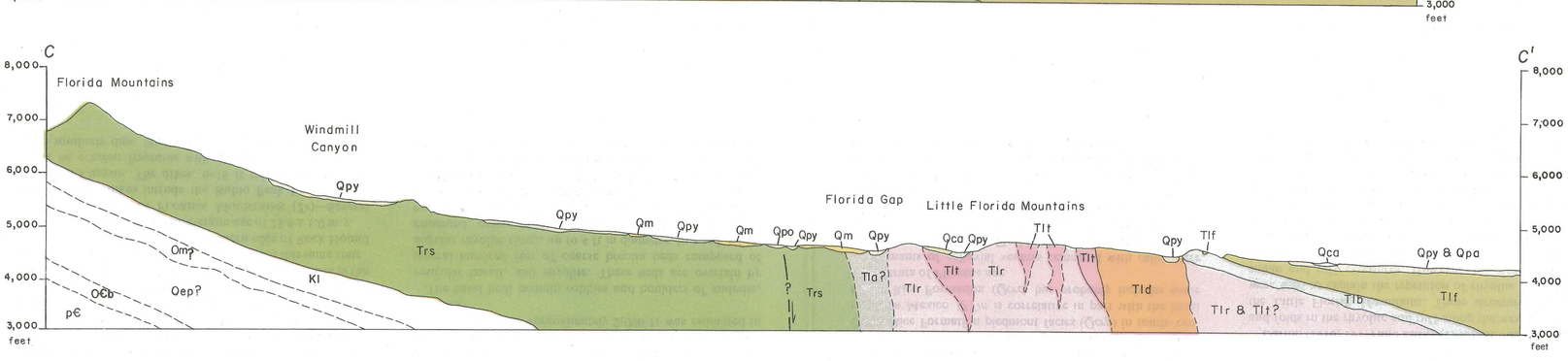
Oep El Paso Group—*Basal unit of dark-gray, medium-crystalline dolomite overlain by thin- to medium-bedded, light- to medium-gray limestone and cherty limestone; few silty lenses; thickness approximately 1,020 ft; not exposed in Florida Gap quadrangle, but underlies Om in cross section C-C′ and crops out on west slope of Capitol Dome*

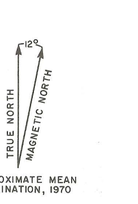
OЄb Bliss Sandstone—*Basal, brown arkose and coarse sandstone overlain by white, medium to coarse sandstone and a few fine-crystalline limestone beds; thickness 50 to 185 ft; not exposed in Florida Gap quadrangle, but underlies Oep in cross section C-C′ and crops out on west slope of Capitol Dome*

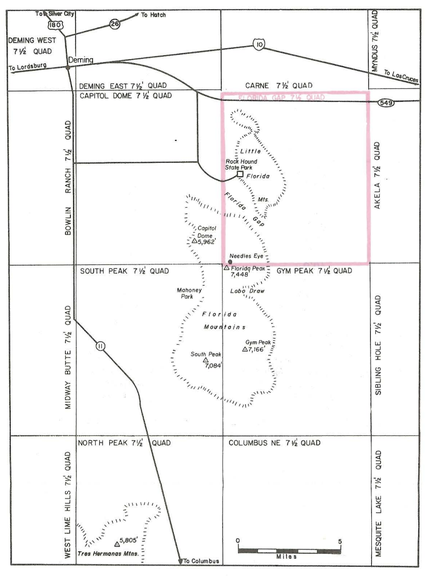
pЄ Precambrian—*Amphibolite and granitic gneiss intruded by coarse red granite; some diabase and felsite dikes; not exposed in Florida Gap quadrangle, but underlies OЄb in cross section C-C′ and crops out on west slope of Capitol Dome*











Location of Florida Gap quadrangle

Geology of Florida Gap quadrangle, Luna County, New Mexico

by Russell E. Clemons, 1982

SCALE 1:24,000

1 0 1 mi

1 .5 0 1 km

Florida Gap quadrangle is in east-central Luna County, approximately 6 mi east-southeast of Deming (fig. 1). NM-549 (old US-70–US-80) crosses the northern edge of the quadrangle, and paved roads from NM-549 and NM-11 go to Rock Hound State Park in the west-central part of the quadrangle. Paved roads from NM-549 and gravel roads provide good access to the Lewis Flats area in the northeast corner of the quadrangle. Access to the remainder of the map area is good via gravel roads and jeep trails to the many cattle tanks, windmills, mines, and subdivisions.

The Little Florida Mountains occupy the northwest third of the quadrangle; the Lewis Flats (elevations 4,100–4,200 ft) portion of the Mimbres Basin covers the northeast corner. Florida Gap (elevation approximately 4,570 ft) separates the Little Florida Mountains (highest elevation 5,634 ft) from the Florida Mountains to the south. The highest elevation in the map area (7,440 ft) is in the extreme southwest corner of the quadrangle, 0.2 mi north of Florida Peak (7,448 ft, the highest point in the Florida Mountains). Needles Eye (formerly called Arco del Diablo) is 0.5 mi east of the high point in the quadrangle.

The Florida Gap quadrangle was included in Darton's (1916) geologic map of Luna County and in the Deming folio (Darton, 1917). Lasky (1940) published a generalized geologic map of the Little Florida Mountains in his report on the manganese deposits of the area. Griswold (1961) included generalized descriptions of the geology and mining districts within the Florida Gap quadrangle as part of his report on the mineral deposits of Luna County. The southwest corner of the quadrangle was mapped by Corbitt (1971).

This report, the result of a detailed geologic study conducted in 1979, is intended as the first phase of a comprehensive geologic and mineral-resource investigation of the Florida Mountains. A geologic study of the Capitol Dome quadrangle will be completed in 1981 and followed by geologic studies of the South Peak and Gym Peak quadrangles. Several age determinations and regional correlations are tentative.

STRATIGRAPHY

Rubio Peak Formation (*Trs*)—The oldest rocks exposed in the Florida Gap quadrangle are assigned to the Rubio Peak Formation (probably late Eocene). The northeast Florida Mountains are composed of approximately 1,600 ft of volcaniclastic rocks. These rocks were mapped as Tertiary volcanic agglomerate by Darton (1916, 1917), Lochman-Balk (1958, 1974), and Corbitt (1971). The rocks consist almost entirely of material derived from andesitic to dacitic tuffs and lavas, with lesser amounts of basalt clasts. The strata are primarily fluvial deposits, but laharic and talus(?) deposits are common in the lower part.

The base of the volcaniclastic sequence is not exposed in the Florida Gap quadrangle. However, within 1 mi to the west and south of the southwest corner of the quadrangle, the sequence is disconformably underlain by the Lobo Formation of Darton (1916). A basal conglomerate is composed of well-rounded clasts, up to boulder size, of limestone, cherty limestone, granite, and occasional andesitic rocks in a tuffaceous, sandy matrix. This conglomerate is overlain by a thick sequence of grayish-purple and reddish breccias of polylithic volcanic clasts, up to several feet in size, in a reddish, sandy matrix. Bedding is generally thick to massive and in places obscure. This sequence grades upward for approximately 100 ft into a light-gray to greenish-gray sequence of massive to medium-bedded breccias and conglomeratic sandstones. The uppermost beds, at the highest point in the Florida Mountains, are fine- to medium-grained sandstones with a few interbedded pebble conglomerates. Here the sandstones are intensely propylitized, very poorly sorted, plagioclase-rich, volcanic arenites with microcrystalline quartz cement. Epidote is extremely abundant and forms bright-green concretions in the sandstones. Epidote concretions up to 10 inches in diameter commonly weather out of the sandstone beds around the Needles Eye, Windmill Canyon, and Spring Canyon areas.

Numerous narrow, mafic dikes intrude the Starvation Draw member, but it is doubtful that they are responsible for the intensive propylitization of at least 1,600 ft of volcaniclastic strata. Possibly, a pluton under the area provided the altering fluids. The dikes, severely weathered near the surface and poorly exposed on steep slopes, appear similar to the diabasic hawaiite dikes north of Fluorite Ridge dated at 37.6 m.y. (Clemons, 1980).

This thick section of volcaniclastic rocks tentatively is correlated with the Starvation Draw member (Clemons, 1980) of the Rubio Peak Formation in the Massacre Peak quadrangle. The basal beds have similar lithology except for the abundance of Sarten Sandstone clasts in the Massacre Peak quadrangle where the Rubio Peak Formation was deposited on the Sarten Sandstone and Colorado Shale; these strata are missing in the Florida Mountains where the Rubio Peak was laid down on the Lobo Formation (probably Early Cretaceous). The great thickness of fine-grained, fluvial beds indicates deposition in a basin farther from the source area than the tuff breccias that predominate in the Good Sight Mountains to the northeast (Clemons, 1979) and Cooke's Range to the north (Clemons, 1980). These areas and the Tres Hermanas Mountains may have been the sources for the volcaniclastic rocks.

Andesite of Little Florida Mountains (*Tla*)—Discontinuous outcrops of basaltic andesite, andesite, and dacite are poorly exposed for approximately 7.5 mi along the western base of the Little Florida Mountains from Florida Gap to the extreme northwest corner of the quadrangle. The andesite is exposed in the roadcut of NM-549 at the western edge of the map. Exact age of this unit is unknown, but it probably also belongs in the Rubio Peak Formation. Darton (1916, 1917) reported thin flows of similar rock (keratophyre) interbedded in the lower agglomerate near Capitol Dome to the west. I have been unable to locate these flows. Darton also reported a hornblende-augite andesite capping the agglomerate 1.5 mi southeast of the Needles Eye. Whether or not the andesite in the Little Florida Mountains is intrusive or extrusive is uncertain. Probably both rock types are present and may have come from some of the same vents that later supplied the voluminous rhyolites.

The dense, finely crystalline rock is characteristically medium gray to brownish gray and varies little in appearance throughout its 7.5 mi of discontinuous exposures. Microscopic examination reveals plagioclase laths (average 0.15 mm) forming a hyalopilitic, pilotaxitic texture. Oxidized hornblende(?) microphenocrysts, tiny grains of magnetite, and an occasional augite microphenocryst compose less than 2 percent of the rock. Chemical analyses of four representative samples are included in table 1.

Ash-flow tuff of Little Florida Mountains (*Tlaf*)—Six small exposures of ash-flow tuff occur west and northwest of The Little Gap. Neither the base nor the top of the ash flow is exposed at any of the outcrops, but the tuff, either resting on or intruded by andesite, is overlain by tuffaceous sediments and flow-banded rhyolite. Approximately 1 mi north of Rock Hound State Park more than 300 ft of south-dipping, massive ash-flow tuff is exposed in the small, prominent, west-trending ridge. Slope colluvium also obscures the contacts at this locality, but the tuff overlies the Rubio Peak Formation and was intruded by flow-banded rhyolite.

The ash-flow tuff is typically a grayish-pink to pale-red rock with abundant small, white, flattened pumice fragments. Pumice is less abundant in the massive tuff. Crystal fragments compose 7–30 percent of the tuff, and lithic fragments, composing up to 8 percent of the massive tuff, are less abundant in the small outcrops to the northwest. The basal part of the massive tuff is a lithic tuff with relatively few crystals. Plagioclase (5–12 percent), sanidine (1–10 percent), quartz (1–8 percent), biotite (1–3 percent), traces of hornblende and sphene crystals, and rock fragments occur in a matrix of abundant axiolitic shards and glass throughout the upper three-fourths of the unit. Hydrothermal alteration has converted the plagioclase to chalky white clays.

A potassium-argon age of 37.3 ± 1.4 m.y. was determined for biotite from the tuff cropping out west of The Little Gap. An age of 32.0 ± 1.2 m.y. was determined for biotite from the massive tuff 1.0 mi north of Rock Hound State Park. The tuff at these two areas probably belongs to the same formation. The younger age for the second tuff is probably the conse-

text continued on back