



FIGURE 46. Structure map of the central part of the Santa Catalina Mountains, showing most of the route of Field Trip III.

SANTA CATALINA MOUNTAINS

TRIP III, ROAD LOG

Thursday, April 2, 1959

Leader: R. L. DuBois

Driving distance: 117.5 miles

Logged distance: 117.5 miles

Starting time: 7:00 a.m.

General Statement

This field trip is planned to encircle and cross part of the largest crystalline massif in southern Arizona. The trip starts at the University of Arizona campus and proceeds via Oracle Road along the west side of the Santa Catalina Mountains to Oracle Junction (fig. 46), then goes by way of the Burney Mines Road to Oracle, and turns southeastward to Peppersauce Canyon. From there the route leads generally south and up a rough dirt road to Summerhaven and the road to the radar station on Mount Lemmon. (Unauthorized persons are not permitted on radar station grounds). The return to Tucson is via the Mount Lemmon Highway, down the southeastern ridge of the Santa Catalina Mountains, past the Palisades Ranger Station, General Hitchcock Lookout, and Molino Basin.

The party will see the following features: (1) The broad, westward-plunging folds in the gneisses of Pusch Ridge, north of Tucson; (2) the cross section of a huge, asymmetrical fold north of Pusch Ridge; (3) the unconformity separating the older Precambrian Pinal schist from the younger Precambrian Apache group; (4) the faint flow traces and crossed foliations of the Oracle granite; (5) the Paleozoic and Cretaceous (?) rocks of Peppersauce Canyon and country to the south; (6) the Leatherwood quartz diorite and metamorphosed Apache group on Mount Lemmon; (7) pegmatitic replacements of the quartz diorite near Mount Lemmon; and (8) the sheared granitic gneiss and the various banded gneisses on the southern slope of the Santa Catalinas.

0.0	0.0	Start behind the Geology Building, University of Arizona. West to Park Avenue. Stop sign. TURN RIGHT (north) to Fort Lowell Road. Traffic lights on Speedway Blvd. and Grant Road. At 1:00, Santa Catalina Mountains, composed of banded gneisses in broad folds plunging toward left and forming dip slopes toward observer.
2.3	2.3	Fort Lowell Road. Stop sign. TURN LEFT (west) to Oracle Road. Traffic lights at N. First Avenue and N. Stone Avenue. Tucson Mountains at 12:00, composed of Cretaceous Amole sediments and volcanic rocks, overlain at left (south) and in foreground by Tertiary Cat Mountain rhyolite and other volcanic rocks.
1.3	3.6	Oracle Road. Stop sign. TURN RIGHT (north). Traffic light at Prince Road. Tortolita Mountains at 11:30, composed mostly of crystalline rocks, structure unknown. Santa Catalina Mountains at 1:00.
2.0	5.6	Bridge across Rillito Creek. Late Cenozoic sediments are exposed in north bank and in road cuts beyond.
1.5	7.1	STOP NO. 1 (10 minutes). PICTURE POINT (fig. 18A). Park as directed. A brief talk will be given on features in view up Pima Canyon. High peaks and left wall of canyon are massive phase of granitic gneiss overlain and underlain by banded gneiss.
1.6	8.7	Ina Road intersection. Altitude 2,500 feet. Enter area shown on figure 46.
3.1	11.8	The thin edge of a massive granitic layer on Pusch Ridge at 4:00 begins on slope to right and can be followed into high cliffs to northeast, underlain by dark, thinly banded gneisses. Development of this structure can be watched on way to next stop. Continue past exposures of late Cenozoic sediments.
3.0	14.8	Bridge across Canada del Oro. Road cut in late Cenozoic sediments on hill above.

1. 2 16. 0 STOP NO. 2 (10 minutes). PICTURE POINT (fig. 18B). Pull into Rancho Romero entrance on right and PARK. A brief talk on features in view will be given. On western face of the Santa Catalina Mountains the massive granitic layer arches gently over banded gneisses which, almost directly east of the view point, reverse in dip and greatly steepen, forming an asymmetrical fold. The steep spur to the east is the northerly limb of the fold. High point on forested ridge is Mount Lemmon.
3. 8 19. 8 Rail N Ranch Road on right. CONTINUE STRAIGHT AHEAD. Good view of western front of Santa Catalina Mountains. Charoleau Gap (eroded on a fault) at 2:00; Samaniego Ridge (highest part) at 3:00; Mount Lemmon, 3:30; northern edge, asymmetrical fold, 4:30; peaks in massive phase, granitic gneiss at 5:00. On some low hills at 3:00, remnant patches of metamorphosed sediments, possibly the Apache group, have been found. In the Tortolita Mountains at 9:00, the structure appears to dip south.
1. 5 21. 3 Village, altitude 3, 100 feet. Route continues past bluffs of late Cenozoic sediments on right. At 12:00, Black Mountain, composed of older Precambrian granite and Pinal schist, with some younger Precambrian Apache group sediments and some Cretaceous-Tertiary volcanic rocks.
4. 0 25. 3 Oracle Junction, altitude 3, 280 feet. TAKE ROAD TO RIGHT. Route ascends northeastward over late Cenozoic sediments. At 2:00, Apache Peak; at 2:30, Rice Peak in Santa Catalina Mountains.
5. 7 31. 0 Burney Mines Road, altitude 3, 800 feet. TURN RIGHT onto dirt road. View of Santa Catalina Mountains to south. At 12:00, Mount Lemmon and Samaniego Ridge; at 11:00, Rice Peak; Apache Peak at 10:00. Oracle Hill at 9:30 and Alta Hill at 9:00. The Mogul fault passes through the saddle at the north base of Apache Peak. The area north of the fault is underlain by Oracle granite, intruded by dikes of diabase and andesite.
0. 6 31. 6 Outcrop of Oracle granite on hilltop at left.
0. 9 32. 5 Road forks. TAKE ROAD TO RIGHT. Altitude 3, 900 feet.
0. 2 32. 7 STOP NO. 3 (10 minutes). A brief talk on features in view will be given. The view eastward up the valley is along the trace of the Mogul fault. Oracle granite is on left (north) side of the fault; Apache group and some Paleozoic sediments (Cambrian Troy quartzite) are on the right (south). Older Precambrian Pinal schist occupies the fault zone in this vicinity. Road forks. TAKE LEFT BRANCH, and descend.
0. 7 33. 4 Exposure of Pinal schist in wash. Dump of Copper Hill prospect on hill above.
0. 5 33. 9 STOP NO. 4 (10 minutes). After passing an outcrop of late Cenozoic conglomerate on right, arrive at exposure on left showing Scanlan conglomerate, at base of Apache group, resting on an irregular erosion surface on upturned Pinal schist. Toward right end of the outcrop, the Pioneer shale of the Apache group rests with faulted contact on the Scanlan. Somewhat farther down the wash and on the righthand side are more Pioneer exposures. Note the condition of these rocks for comparison with the same Apache group rocks that will be seen farther within the mountains to the southeast.
0. 2 34. 1 TURN AROUND.
1. 4 35. 5 First road fork, TURN RIGHT.
0. 2 35. 7 Second road fork, TURN RIGHT. Route winds through hills of Oracle granite traversed by dikes and quartz veins.
2. 9 38. 6 STOP NO. 5 (10 minutes). Gate. Here (200 feet to left of road) are exposed dark inclusions, schlieren, and parallelism of minerals, features used in making the structural map of the Oracle granite (fig. 19). There are also some inclusions of vein quartz.
0. 4 39. 0 Road intersection. CONTINUE STRAIGHT AHEAD, between exposures of Oracle

granite.

- 0.9 39.9 Intersection. Follow main road STRAIGHT AHEAD.
- 0.5 40.4 Highway. Stop sign. TURN RIGHT.
- 0.5 40.9 Oracle, altitude 4,514 feet.
- 0.3 41.2 Leaving Oracle, road forks. TAKE RIGHTHAND BRANCH.
- 0.4 41.6 Begin dirt road. Galiuro Mountains, mostly eastward-tilted Cretaceous-Tertiary volcanic rocks, at 12:00.
- 2.5 44.1 San Manuel smelter stack in view at 12:00. Route passes to left of smooth American Flag Hill, composed largely of diabase intruded into Oracle granite. Dikes of diabase are exposed in road cuts.
- 0.4 44.5 Road forks. TAKE RIGHTHAND BRANCH. Left branch goes to the new town of San Manuel. Apache Peak at 1:00.
- 1.0 45.5 American Flag ranch. Good exposures of Oracle granite in wash.
- 0.8 46.3 Road intersection, Triangle Y ranch sign. Altitude 4,420 feet.

Optional Stop (not to be included on field trip).

Turn right on Triangle Y ranch road.

- 0.3 0.3 Road forks, TAKE RIGHTHAND BRANCH. Road crosses diabase outcrop just before this fork.
- 0.2 0.5 Road forks, TAKE LEFTHAND BRANCH.
- 0.3 0.8 Road forks, TAKE LEFTHAND BRANCH.
- 0.7 1.5 STOP. Granite outcrop just below road has faint foliation in two directions (fig. 19). TURN AROUND.
- 1.5 3.0 Intersection with Mount Lemmon road. TURN RIGHT.
- 1.6 47.9 Copper-lead mill on right. On trace of Mogul fault. Crushed Oracle granite along road. Road winds up hill, makes a hairpin curve above 3C ranch, crosses fault, and continues southwestward over exposures of Escabrosa limestone, and through cuts in Escabrosa and in late Cenozoic conglomerate.
- 1.8 49.7 Peppersauce Canyon, altitude 4,630 feet. LUNCH STOP (30 minutes). The canyon has been eroded here into various sedimentary rocks. Near here are the type localities of the Cambrian Santa Catalina, Southern Belle, and Peppersauce Canyon formations (Stoyanow, 1936, p. 476). The route southward crosses Cretaceous (?) graywackes with steep northeast dips and, locally, gentle southwest dips. At a few places, the Escabrosa limestone can be seen above the road to the southwest, apparently resting on the Cretaceous (?) rocks.
- 2.1 51.8 Just around hairpin curve, boulders of coarse-grained granite (Oracle granite?) appear in the Cretaceous (?) sediments.
- 0.2 52.0 Bridge across stream in Cretaceous rocks below Escabrosa limestone in Nugget Canyon. The Cretaceous is strongly sheared, and the shear planes dip gently westward. Road ascends, crosses saddle, and descends through Cretaceous (?) sediments and, near foot of slope, crosses a narrow band of faintly foliated and lineated rock that may be Wallace's (1954) metadiorite.
- 1.6 53.6 Cross Catalina Wash. Exposures of late Cenozoic conglomerate.
- 0.5 54.1 Hairpin curve, altitude 4,590 feet.
- 0.2 54.3 PICTURE POINT (fig. 18C). Panorama of northeast flank of Santa Catalina

Mountains. Dip slopes on Paleozoic rocks from 11:00 to 2:00. Rice Peak at 11:30. Blocks of younger Precambrian Barnes conglomerate lie scattered on surface. Observe shapes of pebbles for comparison with Barnes pebbles higher in the mountains.

- 1. 1 55. 4 Cattleguard, altitude 4, 740 feet.
- 1. 1 56. 5 Hairpin curve above Stratton Canyon. Road descends past exposures of vesicular latite of Cretaceous (?) or Tertiary (?) age.
- 0. 5 57. 0 Cross stream in Stratton Canyon.
- 0. 2 57. 2 Road forks. TAKE RIGHTHAND BRANCH.
- 0. 3 57. 5 Cross bridge. Schistose rocks exposed in cuts closely resemble Pinal schist, but are believed to be sheared younger Precambrian Pioneer formation.
- 0. 6 58. 1 Barnes conglomerate on hilltop at right. Road ascends past exposures of sheared Pioneer formation, intruded by large sills of rather coarse-grained, foliated quartz latite (Peirce, 1958).
- 1. 8 59. 9 Bridge.
- 0. 3 60. 2 Gold Mill on left. Above this place, road crosses exposures of older Precambrian Oracle granite, followed above by sheared sediments, mapped by Peirce (1958) as Cambrian. Road ascends in hairpin loops.
- 1. 9 62. 1 Cross stream below Lower Control mine.
- 0. 5 62. 6 On dark, locally flow-banded, sheared Leatherwood quartz diorite.
- 0. 6 63. 2 Lower Control mine.
- 0. 3 63. 5 Portal in Leatherwood quartz diorite, altitude 5, 670 feet.
- 0. 3 63. 8 Curve, fresh Leatherwood exposure, view ahead and above of undifferentiated Paleozoic marble, capped by Escabrosa (?) limestone on Rice Peak.
- 0. 8 64. 6 Copper showings in bank are part of dump from mine workings at Stratton Camp.
- 0. 4 65. 0 STOP NO. 6 (5 minutes). On curve where road crosses small stream. Outcrops of Leatherwood quartz diorite.
- 1. 8 66. 8 STOP NO. 7 (5 minutes). Leatherwood outcrops with especially well-developed secondary foliation and lineation.
- 1. 2 68. 0 Water for cars only.
- 1. 8 69. 8 Cattleguard.
- 0. 2 70. 0 Paved road. Pegmatites in Leatherwood quartz diorite. Altitude 7, 820 feet. TURN RIGHT.
- 0. 2 70. 2 Road forks, TAKE RIGHTHAND BRANCH. Road leads upward past cuts in metamorphosed Apache group and Leatherwood quartz diorite.
- 1. 5 71. 7 Saddle with exposures of Apache group on left, guard station on right. Altitude 8, 250 feet. Route ascends past excellent exposures of silicated Apache group.
- 1. 7 73. 4 TURN AROUND. Below radar station at summit of Mount Lemmon. Altitude 8, 950 feet (about 200 feet below summit).
- 3. 0 76. 4 Road intersection. STOP, then TURN RIGHT.
- 0. 2 76. 6 Mount Lemmon Lodge. STOP (10 minutes) for refreshments. CONTINUE STRAIGHT AHEAD.

- 0.7 77.3 STOP NO. 8 (10 minutes). Pegmatites replacing Leatherwood quartz diorite. TURN LEFT on road that winds up hillside.
- 1.3 78.6 Paved road. STOP, watch traffic, TURN RIGHT.
- 1.0 79.6 Apache group sediments in road cut.
- 0.7 80.3 STOP NO. 9 (10 minutes). Bear Wallow. Folds in Apache group, overturned southward.
- 0.7 81.0 Road cuts in granitic gneiss.
- 1.1 82.1 View of Dos Cabezas Mountains ahead in far distance.
- 0.5 82.6 Road cuts in granitic gneiss. Cross contact between gneiss and Apache group.
- 0.2 82.8 Palisades Ranger Station, altitude 7,945 feet. Enter area shown in figure 20.
- 0.6 83.4 Contact, Apache group — Pinal schist and gneisses.
- 0.1 83.5 Contact, Apache group — Pinal schist and gneisses. Route descends through cuts and over very extensive exposures in the granitic gneiss. In some exposures a secondary foliation is developed.
- 5.1 88.6 STOP NO. 10 (10 minutes). Hitchcock Lookout. Panorama of Tucson and surrounding mountains. Lookout is on augen gneiss with foliation striking nearly east-west and dipping gently northward. Lineation strikes northeast. View includes Dos Cabezas Mountains in far distance, S 80° E, with Winchester Mountains in foreground; to the right, on far horizon, the Chiricahua Mountains; Spud Rock, S 35° E; Rincon Peak S 30° E; Mt. Wrightson in Santa Rita Mountains, S 15° W; Sierrita Mountains, S 45° W; Baboquivari Peak, S 55° W; Coyote-Quinlan Mountains, S 65° W, with Tucson Mountains in foreground; Cathedral Rock N 75° W. Route descends into canyon of Bear Creek.
- Warning: Begin descent beyond this stop. Road is paved from here on, but the grades are steep and the curves are sharp. Please control speed and allow ample space between cars.
- 4.9 93.5 Begin sharp curve out of Bear Creek canyon. A few dark layers appear in the augen gneiss.
- 0.4 93.9 Sharp curve, cross small side canyon. Route continues past Federal Prison Camp to Molino Basin. Amount of dark material interlayered in the gneiss gradually increases so that the augen gneiss grades into the banded augen gneiss. Ridge across valley to right is the Catalina Forerange.
- 3.1 97.0 Hairpin curve in Molino Basin. Picnic grounds on right. Route leads down along the right (west) wall of Molino Canyon, past spectacular outcrops of the banded augen gneisses, then curves right and gradually descends southern slope (practically a dip slope) of the Catalina Forerange.
- 5.8 102.8 Road emerges from mountains. Altitude 3,160 feet. Leave areas shown in figures 20 and 46.
- 4.8 107.6 Road junction. CONTINUE STRAIGHT AHEAD.
- 1.6 109.2 Road junction. CONTINUE STRAIGHT AHEAD.
- 1.9 111.1 Road forks. TAKE LEFT FORK.
- 0.5 111.6 TURN RIGHT onto Speedway.
- 5.6 117.2 Stop light at N. Mountain Ave. TURN LEFT.
- 0.2 117.4 Stop sign. TURN RIGHT.
- 0.1 117.5 End of trip.