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Road log for southern Santa Rita Mountains, Santa Cruz and Pima Counties, Arizona

by

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2. Analyses of some late Paleozoic black shale samples and associated rocks, by James D. Vine. 8 p., 4 tables, 12 p. data sheets. 15426 Federal Bldg., Denver, Colo.; 8102 Federal Office Bldg., Salt Lake City, Utah; Kentucky Geological Survey, 307 Mineral Industries Bldg., 120 Graham Ave., Lexington, Ky. Copy from which reproductions can be made at private expense is available in the Library, Bldg. 25, Federal Center, Denver, Colo.; 15426 Federal Bldg., Denver, Colo.; and in the Kentucky Geological Survey.

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Road log for southern Santa Rita Mountains

Santa Cruz and Pima Counties, Arizona

by Harald Drewes

Introduction

Geologic mapping of the Mount Wrightson quadrangle has been completed recently by the U.S. Geological Survey. As a result, I am able to present a summary (table 1) of the rocks exposed and to indicate their ages and relations with each other. The Mesozoic rocks are emphasized because the local geologic record of this era is more complete in the southern part of the Santa Rita Mountains than elsewhere in southern Arizona. For example, there is evidence to indicate that about 10,000 feet of volcanics (including pillow lava), eolian sandstone, and possibly even red beds was deposited during Triassic time and that these rocks were intruded by a monzonite stock before the end of that period. It is hoped that release of the data at this time, prior to the final publication by the U.S. Geological Survey, will stimulate in the geological community of southern Arizona a timely interest in some of the complex problems of the Mesozoic tectonic history. Solutions to these problems may suggest new approaches to minerals exploration in this region.

Acknowledgments.--The geologic investigation of the south half of the Santa Rita Mountains is part of a larger geologic field study by the U.S. Geological Survey, and many ideas presented here have been developed jointly with, or have been tempered by, J. R. Cooper (working in the Sierrita Mountains), Frank Simons (Patagonia Mountains), P. T. Hayes (Huachuca and Mule Mountains), R. B. Raup, Jr., (Canelo Hills and Mustang Mountains), S. C. Creasey (Whetstone Mountains), and T. L. Finnell (Empire Mountains). I am also indebted to R. F. Marvin, H. H. Mehnert, Wayne Mountjoy, T. W. Stern, G. C. Cone, and Creasey, all of the U.S. Geological Survey, for assistance in sample preparation and for the radiometric dating, which provide excellent support for the geologic field relations.

Table 1.--Summary of rocks of the Mount Wrightson quadrangle, Arizona

Age		Radiometric date[1]	Description[2]	
Quaternary	Pleistocene and Pliocene		4 gravel units of which the oldest is faulted	
			Unconformity	
	Pliocene and Miocene		Poorly consolidated conglomerate of Nogales	
			Unconformity	
Tertiary	Oligocene	(6) 27 m.y.	Rhyodacite volcanics of the Grosvenor Hills, about 2,000 ft thick, laccoliths (4 dates) and dike swarm; dacite porphyry dike swarm and granodiorite stock (1 date) of San Cayetano Mountains; rhyolite porphyry dike swarm (1 date) and plug of Gardner Canyon	
			Intrusive	
	Oligocene and Eocene(?)		Rhyolitic and dacitic volcanics and sediments of Gringo Gulch, about 2,000 ft thick	
			Unconformity	
	Paleocene (Laramide)	(8) 60-68 m.y.	Latite porphyry dikes (1 date) (some dikes may be 50 m.y. old and of Eocene age), granodiorite (1 date) and dacite porphyry (1 date) of Gringo Gulch, quartz monzonite of Elephant Head area (1 date), granodiorite of Madera Canyon (1 date[3]), diorite of Josephine Canyon (3 dates), and other plutonic rocks	
Cretaceous	Late Cretaceous		West: Rocks of Salero area: red beds, arkosic conglomerate, and sandstone containing plant fossils; welded tuff (1 date); agglomerate with exotic blocks; andesite; total about 4,000 ft thick	East: Rocks of Sonoita Creek area: arkosic sandstone, red beds, conglomerate and black shale containing Maestrichtian fauna
	-----?-----			---------?----------
				Brown sandstone, siltstone, and conglomerate; total about 5,000 ft thick
				Fault
	Early(?) Cretaceous			Volcanics and conglomerate of Bathtub area, about 2,000 ft thick
				Unconformity
				Volcanics and conglomerate of Temporal Gulch, about 2,000 ft thick
			Unconformity or faulted	
Jurassic	Middle(?) Jurassic	(3) 145-161 m.y.	Granite of Squaw Gulch (3 dates)	
			Intrusive	

Table 1.--Summary of rocks of the Mount Wrightson quadrangle, Arizona--Continued

Age		Radiometric date[1/]	Description[2/]
Triassic	Upper(?) Triassic	(1) 184 m.y.	Monzonite of Piper Gulch (1 date)
			(Unknown)
		(1) 192 m.y.	Red siltstone and dacite volcanics (1 date) of Apache Spring
			Fault
	-----?----- Lower(?) Triassic		Volcanics of the Mount Wrightson area: Eolian sandstone, rhyolitic and andesitic volcanics, pillow lava; rhyolitic volcanics and quartzite; dacite volcanics and quartzite; total about 10,000 ft thick
			Unconformity
Permian			Rainvalley Formation, fossiliferous Concha Limestone, fossiliferous Scherrer Formation Epitaph Dolomite Colina Limestone, fossiliferous
			Fault
Pennsylvanian			Earp Formation
			Fault
			Horquilla Limestone, fossiliferous (Escabrosa Limestone [Mississippian] faulted out)
			Fault
Devonian			Martin Limestone, fossiliferous
			Fault
Cambrian			Abrigo Limestone, fossiliferous
			Fault
			Bolsa Quartzite
			Unconformity or fault
Precambrian			Granodiorite and quartz monzonite porphyry
			Intrusive
			Gneiss

1/ Number in parentheses indicates total number of radiogenic age determinations, including Pb-α on zircon and K-Ar on biotite or hornblende. All ages rounded to nearest million years and presented without the range of analytical error.

2/ Specific rocks that have been radiogenically dated and number of age determinations marked parenthetically, as for example (4 dates).

3/ Dated by Paul Damon, Univ. of Arizona (written commun., 1965).

Road log

Part A: Salero area

Mileage 0.0 Patagonia, Arizona. Travel southwest on Arizona Hwy. 82.

0.8 First roadcuts in altered volcanics of Gringo Gulch (Eocene? and Oligocene). Lower part of cut exposes dacite, upper part is rhyolite.

2.3 First of two roadcuts in gravel, stained black with iron and manganese oxides, and containing anomalous amounts of base metals, which probably are derived from the mineralized rock of Red Mountain to the southeast.

2.8 Turn right (northwestward) on the county road to the Salero area and to Josephine Canyon.

3.1 Ford Sonoita Creek.

3.2 Crossroads. Continue straight ahead on the main road. The purplish-gray rock capping the hills to the northeast is welded tuff marking the middle of the volcanics of Gringo Gulch.

4.7 Pass entrance to Swyer Ranch.

5.1 Poorly exposed sedimentary rocks of Salero area (Cretaceous).

5.9 Pass entrance to Weatherhead Ranch. Beginning of diorite of Josephine Canyon (Paleocene [Laramide]).

8.1 Bear left (westward) at the junction with the Squaw Gulch road.

10.3 Turn right (northward) to the Salero Mine.

10.6 Stop 1. Salero Mine area. Park at the buildings and walk northward past the well in the gully to the hill above the windmill. Tuffaceous arkose (Upper Cretaceous) crops out in the gully and is faulted (fault not exposed here) against dark-gray medium-coarse-grained diorite of Josephine Canyon (Paleocene [Laramide]). Enclosed within the diorite north of the fence is large block of dark-gray very coarse grained monzonite of Piper Gulch (Triassic); another block of granite of Squaw Gulch (Jurassic) appears at the foot of the next hill to the northwest. Review the problems of the volcanics of the Grosvenor Hills and of the welded tuff and exotic blocks of the Salero area. Return to main road.

10.9 Turn left (eastward) on Josephine Canyon-Salero road.

Part A: Salero area--continued

Mileage 11.2 Small saddle marks the contact between arkose of the Salero area and diorite.

13.1 Detour to optional stop. Turn left (northeastward) on Squaw Gulch road. Warning! Drivers of low-slung cars take care--walk if necessary.

13.2 Bear right.

13.5 Stop 2. (Optional) At corral and tank. Walk northeastward up the gully to see the granite of Squaw Gulch (Jurassic). Return to main road.

14.1 Turn left (southward) on road back toward Patagonia.

16.3 Pass entrance to Weatherhead Ranch.

16.4 Stop 3. Roadcut exposes diorite of Josephine Canyon (Paleocene [Laramide]) intrusive into arkosic conglomerate of Salero area (Upper Cretaceous).

17.5 Pass entrance to Swyer Ranch.

18.2 Stop 4. "Pagoda Hill." Rhyolitic tuff, indurated tuff and tuff breccia (Oligocene and Eocene?). Review problems of the age of these volcanics and their relation to the rocks of Red Mountain.

19.4 Turn left (northeastward) on Hwy. 82.

22.2 Patagonia.

Part B: Temporal Gulch

22.6 Turn left (northwestward) at Ranger Station on Temporal Gulch road.

23.1 Bear right. Road lies largely on gravel (Pliocene and Pleistocene).

25.1 Cattleguard at entrance to National Forest. The varicolored tuffs nearby to the west are high in the volcanics of Gringo Gulch. The more somber-colored hills beyond the gulch are dacite lava flows of the volcanics of the Bathtub area (Cretaceous). Granodiorite and dacite porphyry (Paleocene) lie just beyond the high hill to the northwest.

Part B; Temporal Gulch--continued

Mileage 28.2 Stop 5. Summit between Gringo Gulch and Temporal Gulch. Review the geology to the west: Volcanics and sediments of the Bathtub area and the underlying volcanics and sediments of Temporal Gulch (Cretaceous) are exposed in the valley, dacitic volcanics and sediments of the Mount Wrightson area, here hornfelsed by the granite of Squaw Gulch, underlie the low ridge beyond the valley, and the granite of Squaw Gulch (Jurassic) and monzonite of Piper Gulch (Triassic) underlie the more distant higher hills. Review the problem of the Cretaceous-Jurassic unconformity.

29.0 Bear right at junction with the ranch road and reenter National Forest.

30.2 Turn left (northwestward) up the road to Mansfield Canyon,

30.4 Park low-slung cars here; walk up the road.

30.8 Stop 6. Mansfield group mines. Walk up knob to southwest of mines to see dacite flows of the lower member of the volcanics of Mount Wrightson (Triassic). The spur to the north is capped by tuffaceous sandstone, rhyolitic tuff breccia and agglomerate, a southern facies of the middle member of that formation. Farther north flows dominate this member and in Florida Canyon welded tuff is most common. Along the road toward the east are andesitic tuff breccia volcanics of the Temporal Gulch, which continue across the gulch to the top of the upper bluish-gray rocks. The overlying cliffy rhyolitic tuff breccia belongs to the volcanics of the Bathtub area, which are here intruded by porphyritic latite dikes (Paleocene (and Eocene?)).

31.5 Bear right down main road toward Patagonia.

32.8 Bear left (eastward) at junction with ranch road.

33.0 Stop 7. (Optional). Walk to gully immediately north of road to see conglomerate dike in a dacitic tuffaceous sandstone, a unit in the volcanics of the Bathtub area.

35.0 Stop 8. Gringo Gulch. Walk across gulch and up knob to west. Toward the south tuffaceous rocks of the upper part of the volcanics of Gringo Gulch lap unconformably on volcanics of the Bathtub area.

39.1 Turn left (northeastward) on Hwy. 82.

51.2 Turn left (northward) on Hwy. 83 at crossroads in Sonoita.

Part C; Gardner Canyon-Cave Creek area

55.2 Turn left (westward) on Gardner Canyon road.

56.0 Bear left on main road.

Part C: Gardner Canyon-Cave Creek area--continued

Mileage 56.1 Bear right on main road.

60.8 Apache Spring and ranch. To right is the Permian Concha Limestone in the Sawmill Canyon fault zone.

61.5 Ford Cave Creek. Red siltstone exposed along creek (Triassic?).

61.9 Gate at entrance to National Forest and road junctions. Turn right (northward) in front of the gate and cross Cave Creek. Warning! Crossing is rough and best done by pickups and jeeps. Drive or walk to next stop.

62.5 Stop 9. Red beds east of Cave Hill contain interbedded dacitic volcanics (Triassic), and are cut by rhyolite porphyry dike (Oligocene). Review the problems of the Sawmill Canyon fault zone and the structural blocks of Paleozoic rocks in the hills to the northeast and the southwest. Return to gate, noting the abundant boulders of yellowish-brown sandstone and of laminated rhyolitic volcanics of Mount Wrightson (Triassic) in the alluvium along Cave Creek.

63.1 Drive through gate and bear right (westward) up Cave Creek.

63.4 Stop 10. Walk east to the edge of gully to see arkosic sandstone, shale, and conglomerate of rocks of the Sonoita Creek area (Late Cretaceous, Maestrichtian). Across gully the Scherrer Formation (Permian) is faulted over the Cretaceous rocks. End of trip. If time permits, two additional stops can be offered to show more of the volcanics of Mount Wrightson. Return to Hwy. 83 and turn left (northward) toward Benson Highway and Tucson.