

Fall 2006 Fieldtrip Re-cap: A DAY ON THE SCENIC PALOS VERDES PENINSULA

If you didn't attend this trip, here's what you missed:

- Fantastic weather
- Great geology
- Breathtaking scenery
- Fun in the sun
- Excellent leaders and instruction
- Friendly participants

An unmatched combination – but alas, not all is lost – at least you can purchase the outstanding full-color guidebook for a mere \$18.00 (MBR PRICE; NONMBR \$20.00) and do the trip on your own sometime (A DAY ON THE PALOS VERDES PENINSULA: PACIFIC SECTION SEPM FIELD TRIP TO COMMEMORATE THE 60TH ANNIVERSARY OF PUBLICATION OF *GEOLOGY AND PALEONTOLOGY OF THE PALOS VERDES HILLS, CALIFORNIA, USGS PROFESSIONAL PAPER 207*: Pacific Section SEPM book #102; see the Society web page for ordering information),

Saturday, October 7 produced tremendous weather conditions for an expertly run trip and most informative day on the diverse geology of the peninsula. Fifty-seven registered participants, including 23 students from six different schools (CSUN, SJSU, CSULB, CSUFULLERTON, MSAC, CLU), piled into the luxury bus from Gold Coast Tours for a glorious day of sightseeing and geologizing. Fieldtrip leader Dick Brown was very ably assisted by John Foster, Steve Jacobs, Jack Ferguson, Greg Holk, Ed Steiner, and Rick Behl, who deftly led the group through the sedimentology and stratigraphy, Catalina Schist basement rocks, geomorphology, landslides, quarries, and tectonics & structures in this unique look at a rare snapshot of Southern California's Inner Borderland Province. It was a special treat to have "elder statesmen" Bob Garrison, Al Fischer, Gene Fritsche, and Ray Sullivan, and former PS-SEPM officers Jon Kuespert, Rick Stanley, Bill Bilodeau, and Stan Finney join us on this trip.

The day began at Pt. Fermin Park where the group assembled for check-in accompanied by scrumptious pastries and hot coffee delivered by PS-SEPM Vice-President Adam Woods and wife Bronwyn Kelly. The first stop began at the top of the cliff on the seaward edge, with its intoxicating vista, where Rick Behl discussed the Pt. Fermin Sandstone (turbidite fan) facies of the Altamira Shale member, Monterey Formation within the larger context of the Miocene depositional history of the peninsula. Just above the cliff exposure of the Pt. Fermin Sandstone the 120-year old picturesque Victorian-style Pt. Fermin Lighthouse added a touch of culture to our excursion. John Foster followed this by leading a short walk along the upper edge of the Pt. Fermin Landslide, with its "sunken city" weird landscape of variously jostled blocks, some with eerie remnants of pavement and building structures. From here the group boarded the bus and driver Ron whisked us away to 2nd Street in San Pedro for some town geology at Stop 2. Here amongst the houses, retaining walls, and vegetated slopes, Steve Jacobs showed us some of the last remaining exposures of the classic Pleistocene succession. Needless to say the locals did a double-take as several score of eager field trippers poured out of the bus and swarmed into the street. Here we saw the angular unconformity that truncates the

eastward-dipping fossiliferous middle Pleistocene Lomita Marl, Timms Point Silt, and San Pedro Sand succession. Mantling this near-flat unconformity is the upper Pleistocene Palos Verdes Sand, with its famous “fossil hash” bed. Lively discussions ensued, revolving around the hash’s alleged tsunami versus tempestite origin, as well as the sad prospect of how rapidly this geologic treasure is disappearing under the onslaught of urban growth. These somewhat ragged, but very significant exposures stand as a beacon for a stratigraphic/paleontologic wasting asset, a painful emblem of the ravages of the “Obscene” Epoch.

From Second Street, our fun bus rumbled north through the streets of San Pedro, with part of the route, along Gaffey Street, following the abandoned course (“wind gap”) of the Los Angeles River. Jack Ferguson described the history of the river’s course changes during the Pleistocene and Holocene. At the north baseball field just off Gaffey Street, we had to abandon our Stop 3 look at sedimentary structures in the San Pedro Sand because the parking lot was jammed with vehicles for a big baseball tournament. So Dick Brown vividly described what we would have seen as we headed north on Gaffey to the next stop. En route at Five Points on North Gaffey, we were told we were crossing the Palos Verdes fault; however, the surface trace of this major, albeit enigmatic, structure has never been found, even through trenching. Although the surface expression of the fault is elusive, subsurface imaging shows a major structure, and movement on this south-dipping reverse fault during the Pleistocene is generally regarded as largely responsible for the uplift of the Palos Verdes Hills and formation of the anticlinorium. As we turned south on Palos Verdes Drive East and ascended the grade into Rolling Hills Estates, we passed the inaccessible (to nosy geologists) Chandler Quarry, one of the few remaining sizable exposures of the Pleistocene San Pedro and Palos Verdes sands.

At the top of the hill, we left the bus and walked the short distance up Chapparal Lane to the brink of George F (yes, the name of the canyon is George F – careful now!) Canyon to Stop 4 to see the only exposure of Catalina Schist on the mainland. Here, Greg Holk presented a nice poster on the research he has been conducting on the metamorphic petrology and tectonic fabrics of the schist in light of its Mesozoic subduction formation and subsequent Miocene tectonic denudation during the great crustal rotation that produced the Inner Borderland (of which the PV is a part) and the Los Angeles Basin. Basically Greg is using this sole mainland exposure of the Catalina Schist to test the Crouch and Suppe (GSA Bull., 1993) detachment-fault model by looking at kinematic indicators of what happened to the Catalina schist when it was “pulled out” of the subduction zone. The group was then herded 10 at a time along a narrow trail bordering a poison oak-infested, dizzyingly steep slope to see good exposures of the schist with its impressive micro-folds and near-vertical joints. It was mentioned that such an exposure likely was the source for the schist detritus in the Pt. Fermin submarine fan at Stop 1, whereupon someone asked if that was “where the schist hit the fan!” Arghhh!

From here we re-boarded our sleek, sexy orange and gold luxury liner and headed west on Palos Verdes Drive North to stop 5 (Crenshaw Blvd extension), but because the group became restless and mutinied for the lunch stop at Del Cerro Park (stop 6), we went there instead, switching stops 5 and 6 (confused yet?). During lunch, the PS-SEPM officers had their annual business meeting and inducted Kathleen Marsaglia, Cal-State University, Northridge as President-elect for next year. This year’s President-elect, Rick Behl becomes President, and current President, Dave Andersen, becomes Past-President. After lunch, with a magnificent view of the Pacific, looking down across the Palos Verdes landslide to Portuguese Bend, Inspiration Pt. and Portuguese Pt., Ed Steiner gave us a poster presentation on the Portuguese landslide complex – both the ancient slide and

the more famous relatively recent one. Ed's talk and posters provided a most instructive chronicle of the legendary 260-acre modern slide that has been moving continuously since its reactivation in 1956 during the construction of the Crenshaw Boulevard extension. Various attempts have been instrumented to arrest slide movement, most lately by Leighton and Associates' program of shear key buttresses, extensive removals of landslide debris, as well as capping the undeveloped landslide area. An extensive network of sub-drains and extraction and monitoring wells has had the most success.

From Del Cerro Park, we walked the short distance to Stop 6 (original stop 5), Crenshaw extension (the alleged culprit that triggered the modern Palos Verdes landslide), and Rick Behl led us down the hill along the unpaved extension, which is now a hiking trail, to examine outcrops of the middle to late Miocene Monterey Formation. This is one of the best Monterey exposures on the peninsula and is the type section for the three lithofacies (tuffaceous, cherty, and phosphatic) of the Altamira Shale member. We walked down-hill and down-section, examining exposures of the the Valmonte Diatomite, which is the upper member of the Monterey, and then through the phosphatic, cherty, and tuffaceous lithofacies of the Altamira Shale. Armed with posters and fresh data on the silica phases, Rick weaved a tapestry describing the conspiracy of tectonic, oceanic, and diagenetic conditions that make the Monterey so unique.

After working our way down to the base of the exposures, we reversed the trend and worked our way back to the top, up-section, getting a better feel for the time sequence of events subtly recorded in the fine-grained Monterey succession. Completing this trek, the open ice chests with cold drinks in the bay compartments of the bus were a welcoming sight. After swilling down copious quantities of soda and water, we headed north on paved Crenshaw to Indian Creek Plaza (Stop 7) and a view of the Silver Spur valley, thought to be the topographic expression of a graben, and stood above the Silver Spur landslide, which destroyed an office building in 1997. From here, we headed south to Palos Verdes Drive South and drove east, past the Pt. Vicente Lighthouse, and stopped briefly at a rest stop overlook, with excellent views of a present-day wave-cut platform developed on crenulated Altamira Shale beds, as well as orange-weathered basalt dikes and sills, and of course, the stunning vista on a beautiful fall afternoon. Continuing east, we crossed the Abalone Cove landslide, beginning at the famous Wayfarer's Chapel, and then the Portuguese landslide where the road became bumpy and the landscape rumply.

Just beyond Portuguese Bend, we turned left on Forrestal Drive into the 160-acre Forrestal Nature Preserve to see the Livingstone Quarry (Stop 8), whose walls present impressive exposures of deformed Altamira Shale laced with basaltic-andesitic dikes and sills, and some pillow basalt flows, as well as veins of dolomite and barite crystals. During its 30-year operation, the Livingstone Quarry produced rip-rap, crushed stone, and breakwater material. From Livingstone Quarry, we headed back out to Palos Verdes Drive South to White Point and Stop 9. After unsuccessfully trying to talk the parking lot attendant out of the \$18.00 entrance fee, driver Ron deftly squeezed our leviathan luxury liner past the kiosk and into the parking lot; a short walk led us to the base of the cliff and the spectacular recumbent folds in the Altamira Shale. The most popular interpretation seems to favor syn-depositional gravity sliding. This was a fitting stop to top off an enjoyable day on the scenic peninsula. We arrived back at Pt. Fermin Park at 5:00 pm.

Special thanks are extended to Dick Brown for organizing the trip and to PS-SEPM Vice-President, Adam Woods, who handled the logistics. Pacific Section SEPM is also deeply grateful to Dick for the permission and opportunity to publish, as its book number 102, an abridged and edited version of the 2004 out-of-print LABGS guidebook,

PALOS VERDES PENINSULA: FABULOUS GEOLOGY IN A BEAUTIFUL SETTING.

John Cooper, December 2006



Ed Steiner (left) and Dick Brown (right), discussing the Portuguese Bend Landslide, Del Cerro Park, Stop 5.
Photo by Dave Andersen



Rick Behl on outcrop at base of cherty lithofacies of Altamira Shale member, Monterey Fm., Crenshaw ext., Stop 6.
Photo by Dave Andersen