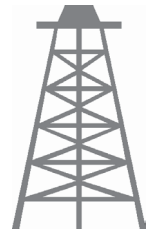




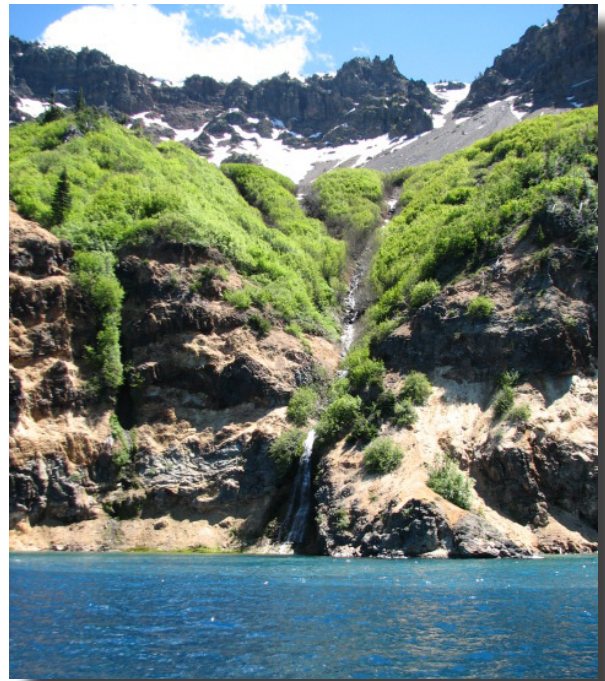
Pacific Petroleum Geology



NEWSLETTER

Pacific Section • American Association of Petroleum Geologists

September & October 2013



Geologic Features of the Pacific Northwest

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NEXT Newsletter Deadline

(November/December Issue): Nov. 1st

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COVER PHOTOS: Geologic features of Crater Lake, Oregon. Clockwise from upper left: 1. Liao Rock rhyodacite dome; 2. Spring-fed vegetation of Chaski landslide; 3. U-shaped glacial valleys Kerr Notch and Sun Notch, viewed from across the lake; 4. Wizard Island cinder cone. *Photos by Tim Elam and Dave Grimes*

Dear Pacific Section AAPG and Society Members,

This summer has been fully packed, from a personal side and from my perspective of our industry.

For me, the summer started on a real high note. I was able to race my vintage car at Laguna Seca Raceway near Monterey. This is one of those bucket list things I have been wanting to do for some time. I've raced many of the other road racing courses in the West, but Laguna Seca has to be the pinnacle. What a great weekend! Between races, I was chatting with one of my long time competitors from Northridge (he drives a MG-B, I drive a Turner). We were talking about what we did and after telling him that I was a geologist, he asked if I knew Gene Fritsche. I said I did, through many years of meetings and LA basin field trips, and I asked how did he know Gene? It turns out that Gene and David were members of their church choir, had sung together for years, and that Gene had an amazing singing voice.



A month or so later, Gene passed away. He will be missed for his humanity, knowledge, leadership, and ability to teach. It is truly a small world. As the summer went on, the opportunity for recollection and engagement continued. I had the honor, along with several members of our Section and Affiliated Societies, to go to Tulsa for Leadership Days. Pacific Section was very well represented (Bob Lindblom, John Williams, Jon Schwalbach, Plamen Ganev, Jonathan Allen, Elizabeth Steel, Joe Whearty, Vaughn Thompson, and myself). We participated in many of the events and had a good chance to talk about what we did, who we worked with, and who had influenced our lives. It got me thinking about those key people I first met when I joined Shell, 35 years ago. My view of geology, understanding of oil fields, and appreciation for the business was shaped by the people I worked with at the Bellaire Research Center, and within Shell Exploration and Production. Rufus LeBlanc, Monroe Waxman, Sig Snelson, Burt Bally, Mike Forrest, Marlin Downey, Jerry Lucia, Steve Sears. They all were outstanding scientists and really wonderful people. They taught me about stratigraphy, Cajun food, and big band music; about petrophysics and wine tasting; structure and critical thinking; carbonates and fly fishing, and about integrated geological concepts and making tough business decisions. At Leadership Days, I was talking to our YP and Student Chapter reps, and it occurred to us that those people that shaped me, did it in and out of the office. Knowledge is passed on in the classroom and at the outcrop, but also in the bar or at a party. Experienced geologists need to spend real time with students and young professionals. It is the only way that our science will stay strong, and AAPG will continue to flourish.

The rest of my summer was filled with joy and some sadness. I was the father of the bride for my daughter's wedding in July, overlooking the Pacific from Malibu. It was a wonderful time, filled with good memories and happiness. I was also the best man at my older brother's wedding in August, up at Big Bear Lake. We had a great time with family and friends. I had the opportunity to recall the fun we had growing up in Pacific Palisades, hiking in Rustic Canyon, hanging out at Will Rogers Beach, and being with friends. Between these joyous events came the passing of my mother. She saw a lot during her 98 years. Traveled widely, raised four very independent children, loved history, art and music, and as I discovered, carried on decades long correspondence with friends and relations, young and old alike. She was always current, had a great sense of humor, and brought joy to all she knew. She also got me interested in geology, at a very young age. We took trips to Hawaii, Yosemite and the Grand Canyon, and she used to bring rock samples back from her world travels: marble from Italy, granite from Egypt, chalk from England.

So, why am I telling you all this? It is my heartfelt plea that we, as geoscientists, whether we are in industry or academia, energy or environmental, take the time to know those we work with, to get together and discuss our science with older or younger members of our craft, and most importantly that we listen and exchange knowledge. It is the only way we can ensure a bright future for geology, for society, and for the planet upon which we live.

Daniel Schwartz
President, Pacific Section AAPG.

Yesterday, August 25th, the high temperature was in the 40's (F), the wind was stiff, and hail covered the ground. Where was I? Why was I there?

It was just another exciting... wait a minute the weather will change... day here at Crater Lake, Oregon. I am fortunate enough to be one of three Volunteer Park Rangers here this Summer; the gig ends Sept.15 for me.

I had never been to Crater Lake National Park before showing up to work...I mean volunteer...on June 10, 2013. I guess I am easily fascinated by seeing the beauty (and geology) of America's National Parks and Monuments. In 2009, I spent the Summer volunteering in SW Utah at Grand Staircase-Escalante Natl. Monument. Last summer, I was a Ranger at Petrified Forest Arizona, National Park.

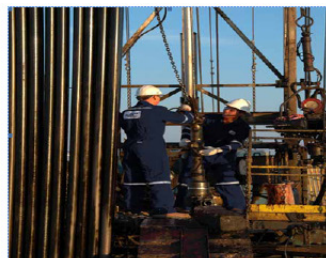
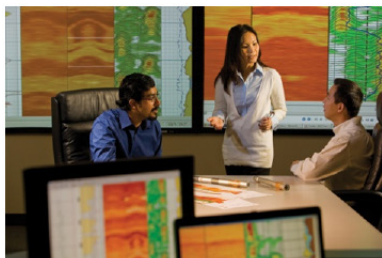


The centerpiece of this park is Crater Lake, a lake formed in the caldera of Mt. Mazama. It truly is beautiful. Can't find Mt. Mazama on any atlas? That's because this 12,000 foot peak erupted and collapsed 7700 years ago. Yes, that is a fraction of a second, geologically speaking. Most of us that have gray hair (or no hair) can remember the catastrophic and tragic 1980 eruption of Mt. St. Helens, Washington. That was big...but the eruption of Mt. Mazama was bigger...100 times bigger. Mt. St. Helens lost 1300' of elevation in 1980. Mazama dropped +/- 7000 feet. A lake filled the void within +/- 500 years. The rim elevation is 7000-8000'. The lake is the star of the park; it's superlatives include maximum lake depth (at 1943', the 2nd deepest in North America) and clarity (#1 in the world.)

My job here is to narrate on tour boats and trolleys, give Interpretive Ranger talks at various locations, and answer park Visitor Center questions...face-to-face or via phone. One gets really good at describing bathroom locations. Many questions this year have had to do with smoke from forest fires. On July 26, more than 2000 lightning strikes hit Oregon. Those led to three major fires forming west of the park that have burned +/- 90,000 acres. Resultant smoke occasionally obscurs views and affects breathing here at Crater Lake.

I am one of only two rangers who has a geology degree, but there are plenty of bright seasonal folks who are knowledgeable on many subjects. All seasonal rangers had a three week orientation prior to "going live" with the public on June 28. Geology is a big part of the story here, but wildlife and botany stories abound. Visitors perk up when we talk about bears, fish, deer, foxes, birds, trees, flowers, and local Klamath Native Americans.

So why is this column ending up in the *PPG Newsletter*? Well, the geology is great here and in many National Parks and Monuments. Each year, there are volunteer opportunities at these facilities...some seasonal...some year-round opportunities...where our geologic expertise is useful...I dare say needed. As a volunteer, I get to interact with like-minded, science-oriented folks...both visitors and other rangers. My housing is free, and I get a small daily stipend. If you are looking for a change of pace, I highly recommend volunteering at a National Park. To see what's available, simply type in www.volunteer.gov. That website is a clearinghouse for Bureau of Land Mgmt., National Park/Monument, Corps of Engineers, and other Federal Government opportunities.



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Dr. A. Eugene Fritsche passed away on July 7, 2013. Dr. Fritsche was a highly respected, long-time member of PSAAPG. Below is text of a speech given at his memorial service by Dr. Vicki Pedone, Chair of the Cal State-Northridge Dept. of Geological Sciences. The service was held on August 17, 2103, at the First United Methodist Church in Reseda, Ca. In addition to the many awards listed below, Dr. Fritsche was a recipient of PSAAPG's Distinguished Educator Award in 1992 and PSAAPG Honorary Life Membership in 2011.- EDITOR

I speak today on behalf of all of us who knew Gene best as a geologist, a colleague, and a teacher.

Philosophers and poets through the ages have often asked the question of how do you take the measure of a man? And so, we now ask, How do we take the measure of Gene Fritsche, geologist and teacher?

We could measure it in terms of the accomplishments of his career.

Gene Fritsche earned his Bachelor's degree in Geology from UCLA in 1958 and his PhD from this same institution in 1969. He was appointed as a faculty member of the Department of Geological Sciences at California State University Northridge in 1963 and served in this position for 37 years until his retirement in the year 2000. He served twice as department chair, leading the department to create and maintain strong programs and training of undergraduate and Master's candidates. Gene was a leader in many professional organizations, serving as an officer, editor, field trip leader, and conference convener for the Society of Sedimentary Geologists, the American Association of Petroleum Geologists, the Geological Society of America, and the Coast Geological Society.

Gene was awarded many honors during his career. He was given an honorary lifetime membership in the Pacific Section of the Society of Sedimentary Geologists in 1982 for his outstanding service and leadership. He was later honored by this same society in 2001 with the first ever lifetime achievement award, which is now named in his honor. Two other awards were particularly dear to Gene because both were given in honor of his teaching. In 1997, he received the Distinguished Teaching Award from Cal State Northridge for a career of superlative teaching. Gene was awarded the Grover E. Murray Distinguished Educator Award by the American Association of Petroleum Geologists at their convention in 2007. This national award is given in recognition of distinguished and outstanding contributions to geological education.

Gene Fritsche set foot on every continent on Earth and never lost an opportunity to learn about the local geology. But his first and greatest love of geology was the Cenozoic rocks of southern California. Gene's first mapping project in 1957 was in Miocene rocks in the eastern Santa Monica Mountains, and his last published abstract in 2006 was on the Miocene volcano exposed in the western Santa Monica Mountains. He walked the ridges, hiked the stream cuts, and crawled through the chaparral to examine these rocks and their stratigraphy, especially his beloved Miocene, in order to decipher the complex evolution of this sequence. Gene truly was a legend in his knowledge of these rocks, respected and admired by the more than 1000 geologists that he lead on field trips in southern California over the 50 years of his career.

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Gene Fritsche published 30 scholarly papers and 70 abstracts on his research, most with student co-authors. His research fully engaged his scientific curiosity, but his teaching engaged his heart. Gene taught 12 courses and advised 29 Master's theses and 34 Senior theses during his 37 years at Northridge. In addition to teaching at CSUN, Gene was the lead instructor for Louisiana State University Summer Geology Field Camp in near Colorado Springs for 9 years. He transformed the camp from a disorganized one that lacked academic standards and fair grading practices to an exemplary one with rigorous academic standards and grading practices that fairly tested the students' abilities.

Few geologists will ever match the career achievements of Gene Fritsche. But as remarkable and as impressive as they are, they are not what bring us here today. How, then, do we take the measure of Gene Fritsche, geologist and teacher? What we will forever hold in our hearts are the lessons that he taught us, lessons about geology, lessons about life.

He taught us about integrity. I mentioned that Gene crawled through the chaparral in pursuit of geologic knowledge. What I didn't mention was that Gene was quite sensitive to poison oak, and the chaparral of southern California abounds with it. Yet knowing that he would likely get a case of this painful rash never deterred Gene from reaching an outcrop of rock that he had not studied. Integrity means that you never settle for "I think" if by making more effort you can say "I know." Integrity means tackling the difficult and challenging because only then will you feel pride in your work and pride in yourself.

Gene taught us that detail matters. Gene was a stickler for detail. How many of you here ever had a field report graded by Gene? Remember the unit modifier? Can any of you to this day write a phrase like "the 5-km-long race" and not sense Gene peeking over your shoulder to make sure that both those hyphens are there in the right places? The lesson that he was teaching us was not about hyphens, but that small things matter. Because if we are careless and indifferent in our attitude to the small things, we can easily become careless and indifferent in our attitude to the important things.

Gene taught us never to close our minds, to never stop questioning, never stop exploring. Gene revisited outcrops again and again over the years. He continued to see new things, make new connections, develop new hypotheses. We move forward as scientists and as people by continuing to question and to seek greater truths. This is what makes the journey of geology and the journey of life exciting and fulfilling.

This is how we take the measure of Gene Fritsche, geologist and teacher. He made us better geologists. He made us better people.

-Vicki Pedone



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Dr. Fritsche receiving the PSAAPG Honorary Life Membership Award from then President-elect Tony Reid at Vasquez Rocks, Los Angeles County, May 28, 2011




Date: Unknown
Location: Unknown
Pie: Pumpkin

Dr. Fritsche was a major inspiration to me early in my studies. It is interesting that Dr. Fritsche's field partner in Summer Field at UCLA was Sterling Prior, who was my 8th grade science teacher. My English teacher at CSUN once remarked in class that he didn't think his English was good enough for Fritsche and he was glad that he didn't have to take him. It was under Dr. Fritsche that I learned hard work and attention to detail would pay out over time. It proved true during my equity determinations for the Long Beach Unit of the Wilmington oil field. Probably the biggest two lessons that I learned from him was that giving was much better than receiving and geology is a wonderful and creative field that is totally wonderful. We are so lucky to be geologists.

-Don Clarke, Former PSAAPG President

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PSAAPG member Danny Sherman Scopen passed away suddenly and very unexpectedly from a brain aneurysm in on July 9, 2013 in Covina. CA.

Dan was born March 23, 1945 in Los Angeles, California and is survived by wife Nancy, children Vince Scopen, Audra Scopen, Alicia Wilson, Amanda Scopen and Charla Kiolbassa.

Dan graduated from California State University in Los Angeles in 1967 with a Bachelor of Science in Mathematics. He attended a recruitment fair prior to graduation. One of the booths he visited was sponsored by Texaco. He inquired about a particular job but after a few minutes questioning Dan, the recruiter said, "You don't want to do that, you want to be a Geophysicist." And so it began.

Dan worked for Texaco in Houston, Texas after graduation. He decided to leave Texaco to come home to be closer to family and friends. After he had been home a short while he contacted Texaco to see about returning to work for them, they had an opening for a Geophysicist in Ventura. He commuted to Ventura for a couple of months preparing to move there. Just then, it was announced that the Ventura office was to be combined with the Los Angeles office on Wilshire Blvd. Dan carpooled from Covina with B.J. Witt for 10 years. B.J. was a great guy and a good friend. Dan formed many lifelong friendships with some of his coworkers in that Tishman Building. It was said he once draped a long paper seismic section over his shoulders and ran through the office shouting "Seismic Man is here to save you".

After 10 years, Dan decided to become a consultant. Through the years he worked on many projects for many companies, from the China Sea with Oxy to working up his own plays in California. His contacts were many and far flung. He continued to work on various projects until his passing.

He loved telling stories. He told stories about working in the field, on ships (some of his favorite contracts), friendly and not so friendly office work, and the big play that got away.

Dan got a big kick out of life. The next time you raise a glass, give a little toast to a great guy.

-Nancy Scopen and Dale Kunitomi
July 17, 2013

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“A Wonderful Record of Life, and a Rich Mine of Results” – Early Geologic Observations of the Tertiary Formation of Monterey, California

**Stephen M. Testa;
Executive Officer, California State Mining and Geology Board**

For a formation, the Monterey Shale receives a lot of attention due to its vast thickness, areal extent and exceptionally high content of organic remains. The increasing role of unconventional and alternative energy resources, and technological advances in horizontal drilling and hydraulic fracturing simulation techniques, has again brought the Monterey front and center. All geologists working in California have come upon the Monterey formation at some point in their career. The Monterey formation spans some 1,750 square miles from Central to Southern California, and some have claimed that the Monterey formation contains up to two-thirds of the United States' shale oil reserves, and 15 billion barrels of oil. Whether production from the highly fractured Monterey will be significantly enhanced as we have seen in other shale formations throughout the country remains to be proven. If true, it is estimated that a shale boom in California could yield between 512,000 and 2,815,800 new jobs statewide. However, the geological roots of our interest in the Monterey formation extend back to the mid-1850s, when a young geologist arrived in the coastal town of Monterey and checked into the Washington Hotel. He wrote in his field notebook - “Highly cold wind and fog at Monterey” – it was 5 p.m. on May 1, 1854.

The twenty-eight year old William Phipps Blake has arrived in Monterey by ship after spending almost a year serving on the Pacific Railroad Survey (Figure 1). In 1853, four expeditions were authorized by Congress under the administration of President Pierce, and Jefferson Davis as Secretary of War. The purpose of the expeditions was to explore the span of country virtually unknown at the time lying between the Mississippi River and the Pacific Ocean. One of these expeditions was placed under the charge of Lieutenant R. S. Williamson of the United States Topographical Engineers, with Lieutenant J. G. Parke as second in command and topographic engineer, and Blake as geologist and mineralogist (Williamson, 1956).

With his field work completed in December of 1853, Blake arrived in San Francisco on Christmas Day and worked on his report over the next several months while conducting several geological reconnaissances when time permitted. In June 1854, Blake would receive “a fragment of a white, porous earth, resembling chalk; but which, for its lightness and general characters was considered to be infusorial”. This sample was collected by A. S. Taylor, Esq. of Monterey and forwarded to former State Geologist Dr. J. B. Trask who forwarded the sample to Blake, who then forwarded the sample to Professor J.W. Bailey at West Point. Bailey would note in correspondence back to Blake that the sample “is rich in marine diatoms”, including *Cascinodiscus*, among others, and is similar to living Pacific species and “many species that could have only grown in shallow water”.

Recognizing the importance of the deposit, Blake traveled to Monterey. The timeline of this account differs from his short paper published in 1855 titled “*Notice of Remarkable Strata containing the remains of Infusoria and Polythalamia in the Tertiary Formation of Monterey, California*” where he notes not making the trip to Monterey until June of 1854 (Blake, 1855); whereas, his trip as chronicled in his field notebook indicates him arriving in Monterey on May 1, 1854, and exploring the area over the course of three days.

On May 3, 1854, Blake would record in his field notebook:
“*Locality is distant about two miles from the center of town in a S.E. direction from this Fort. The white bed can be seen from all parts of the town cropping out in the side of the hills – which is partly covered with a growth of chemiselle. The locality is only a few hundred yards from the stage road to San Francisco.*”

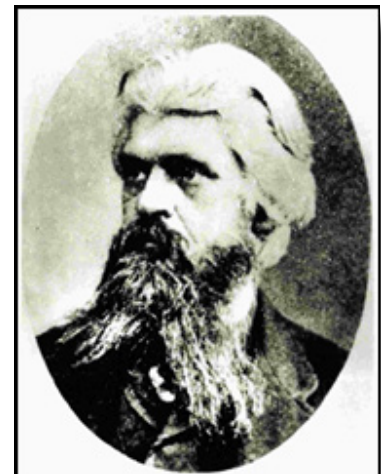


Figure 1. Portrait of W. P. Blake as a young geologist with the Pacific Railroad Survey.

Continued on Page 11

Blake (1855) would later refine his description as “About 2 miles distant in a south-east direction from the centre of town and forms a portion of a hill which fronts the bay and rises on the east side of the stage-road to San Francisco. This hill is between 500 and 600 feet high, and is separated from the bay by a broad sandy plain and a belt of sand hills along the beach, west-central CA.”

Hanna (1928) states the specific locality is described as being situated on the “northwest side of long ridge which partly encircles the bay; exposure can be traced from line of Monterey-Salinas Highway to and a little across Monterey-Carmel Highway, a distance of about 4 mi.”

Blake’s first description of the outcrop is noted in his field notebook, on May 1, 1854, and later published (Blake, 1855) stating:

“This out-crop appears to be the principal stratum, and it is near the top of the hill; but lower down a succession of strata are found alternating with siliceous beds, which are peculiarly compact and very finely stratified. Some of these are excessively hard, and break with a conchoidal fracture like flint or semi-opal. The whole forms a series of parallel strata which are not horizontal, but dip south of east, or nearly south-easterly, at an inclination of from twenty to thirty degrees.”

The geologic section of the exposure from Blake (1855) is described as follows:

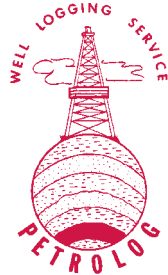
Table 1

No.	Description	Feet	Inches
1	White siliceous earth, light, and charged with infusoria	50	-
2	Compact and siliceous, probably bituminous,	-	3
3	White and earthy, resembling 1,	1	-
4	Compact, siliceous, dark colored and bituminous,	-	6
5	White and earthy, like 1,	12	-
6	Compact, siliceous, dark colored and bituminous,	-	6
7	White and earthy, like 1,	2	-
8	Compact, flint-like, very hard and pearly white. In thin layers,	2	-
9	Thin layers of white earthy material, similar to No. 1; intercalated with thin sheets of compact and semi-opaline silica,	10	-
10	Compact and siliceous. Hard and drab-colored	3	-
11	White and earthy, similar to No. 1 (The thickness of this stratum was not estimated; it extends downwards, under the channel, for a long distance.)	-	-

Note: Succession of strata from the upper stratum downwards to the lowest point examined.

Blake (1854) would remark on the general geology of the area, and the mineralogical and fossiliferous nature of the exposure stating: “Stratified sediments of white clay and argillaceous sand all of a light color – of very fine materials. Remains consolidated and some portions with a semi-vitreous luster and fractures like ivory... This interesting formation teeming with the skeletons of microscopic organisms,

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appears to overlie and to be conformable with the Tertiary strata that underlies a part of the town of Monterey and extend to and beyond the mission of San Carlos.”

Blake (1855) also noted “On the top of this formation there is a rudely stratified or assorted mass of boulders and gravel, like the accumulation along a beach” concluding significant uplifting by “*a remnant of a former shore now five hundred feet above the ocean.*” And further remarked that “*This locality is now at an elevation of about 60 feet above the beach and one quarter mile from it. It presents convincing evidence of the comparatively recent elevation of the coast.*” The bituminous nature was also noted.

Blake would informally use the term “Monterey formation” in reference to these rocks (1855), and generally receives credit for naming this unit (1855, p. 331). The use by Blake of applying names to rock-stratigraphic units preceded the practice of applying names to rock units decades later. The term Monterey shale was eventually approved by the United States Geological Survey in 1902 after correspondence with several California geologists (USGS, 1928).

Blake was a renaissance man, characteristic of many educated men of his times, and was a significant geologic figure during the latter half of the 19th Century, with notable geologic contributions in California (Testa, 2002). Blake was the first professional geologist to explore California, and California’s first professor in geology and mining. He was a scholar and a man of action, well-read, and very familiar with the geologic literature of his time. A keen observer, he typically combined local detail with regional interpretation and global analogies. He was careful to include only those details he personally observed, thus whatever gaps, omissions or generalizations he made exemplify the brief reconnaissance of much of his field work.

Blake (1855) would conclude his comments on the Monterey with “*The formation, so far as already known, is a wonderful record of life, and a rich mine of results for the geologist and paleontologist.*” The Monterey would be the first geologic formation to be described in California and also contained the first fossil known to have been described in California.

Just how wonderful and rich will the Monterey formation turn out for Californians? – Well, time will tell. However, all this reminiscing brings us back to a rock formation that has been studied since the mid-1800s when on a cold, windy and foggy day a young geologist sat in front of a rock face comprised of regular strata of light-colored argillaceous and arenaceous, and fossiliferous rock, attempting to decipher its secrets (Figure 2).



Figure 2. Sketch by Blake making geologic observations of the Monterey formation on May 3, 1854.

Blake, William Phipps, 1854, Field Notebook, Vol. 34.

Blake, William Phipps, 1855, Notice of Remarkable Strata containing the remains of Infusoria and Polythalamia in the Tertiary Formation of Monterey: Proceedings of the Philadelphia Academy of Natural Sciences, vol. 7, pp. 328-331. [Note: title page of proceedings denotes 1856].

Hanna, G. Dallas, 1928, The Monterey Shale of California at its Type Locality with a Summary of its Fauna and Flora: Bulletin of the American Association of Petroleum Geologists, Vol. 12, No. 10, pp. 969-983.

Testa, S. M., 2002, Josiah D. Whitney and William P. Blake: Conflicts in Relation to California Geology and the Fate of the First California Geological Survey: Earth Sciences History, Vol. 21, No. 1, pp. 47-76.

United States Geological Survey, 1928, Lexicon of Geologic Names in the United States, USGS Bull. 896, pp. 1406-1407.

Williamson, Lt. R. S., 1856, Report of Explorations in California for Railroad Routes, Reports of Explorations and Surveys from the Mississippi River to the Pacific Ocean, 1853-54; War Department Corps of Topographical Engineers, Senate of the United States, 33rd Congress, Vol. V, Ex. Doc. No. 78, Washington, D.C.; Part II, Geological Report, William P. Blake, 1857, 393 p.

California oil production inches upward?

In April, 2013, The California Division of Oil, Gas, and Geothermal Resources released a preliminary review of 2012 California oil and gas statistics, based on ten months of 2012 data. The next two pages document some of that published preliminary review.

New Well Operations

	<u>2012</u>	<u>2011</u>	<u>2010</u>	<u>2009</u>	<u>2008</u>
Wells Drilled	3081	2294	2103	1920	3410
Wells Completed to Production	2195	2342	1788	2570	2909

Oil Production By Year (millions of barrels)

	<u>2012</u>	<u>2011</u>	<u>2010</u>	<u>2009</u>	<u>2008</u>
State Onshore	184.3	184.5	187.8	194.9	200.5
State Offshore	13.2	12.3	13.0	13.3	14.1
Total	197.5	196.8	200.9*	207.2	214.6

California's overall oil production rate increased slightly in 2012, averaging about 541.1 thousand barrels per day, a increase of 0.5 percent from the 2011 average of about 539.2 thousand barrels per day. The state onshore area production decreased about 0.1 percent from 2011 and the state offshore area increased 6.2 percent from 2011. Midway-Sunset oil field continued to be the largest producing oil field in California in 2012.

Oil Production By Year by Field (millions of barrels)

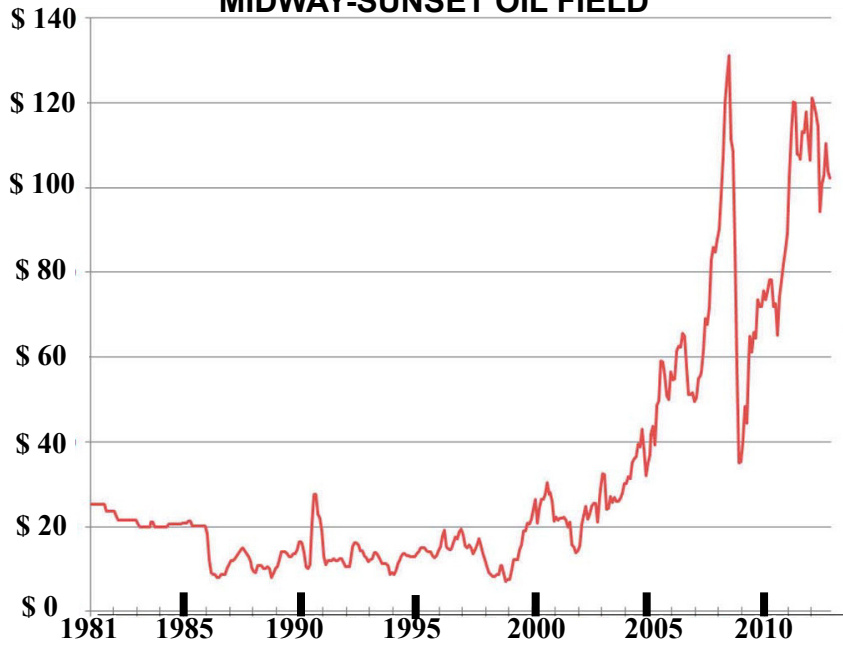
<u>Largest Fields</u>	<u>2012</u>	<u>2011</u>	<u>2010</u>	<u>2009</u>	<u>2008</u>
Midway-Sunset	29.3	30.6	32.4	34.2	36.3
Kern River	26.2	26.8	27.4	29.1	29.5
Belridge, South	23.6	25.2	26.5	29.5	32.5
Elk Hills	14.0	14.2	14.1	13.8	14.9
Cymric	13.6	13.1	15.5	18.3	18.0
Wilmington	13.3	13.0	13.4	13.6	14.7
Lost Hills	11.0	11.2	11.4	11.6	11.8
San Ardo	7.2	6.8	6.1	5.3	4.7
Coalinga	5.5	5.6	5.6	5.9	5.8
Ventura	5.1	5.1	4.6	4.2	4.2

Oil Prices

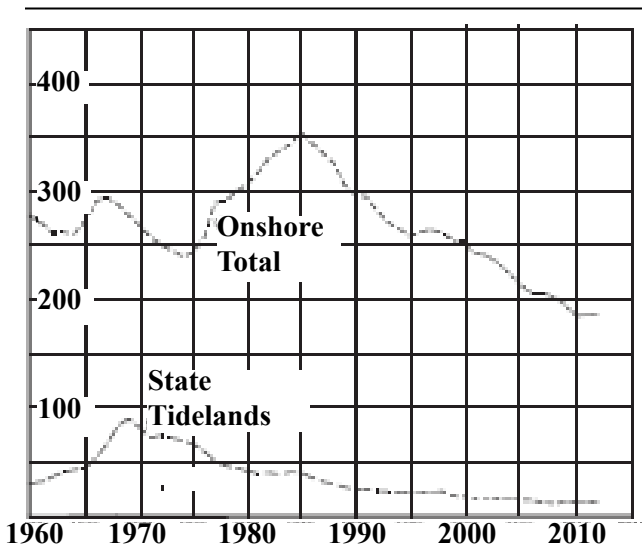
The posted price for Midway-Sunset 13 degree API gravity crude oil started the year at \$106.25 per barrel and ended December 31, 2012, at \$105.65 per barrel. The yearly high was \$121.25 per barrel on February 24th.

* Rounded to significant figures; therefore, added figures may not agree with totals.

**CRUDE OIL POSTED PRICES
MIDWAY-SUNSET OIL FIELD**

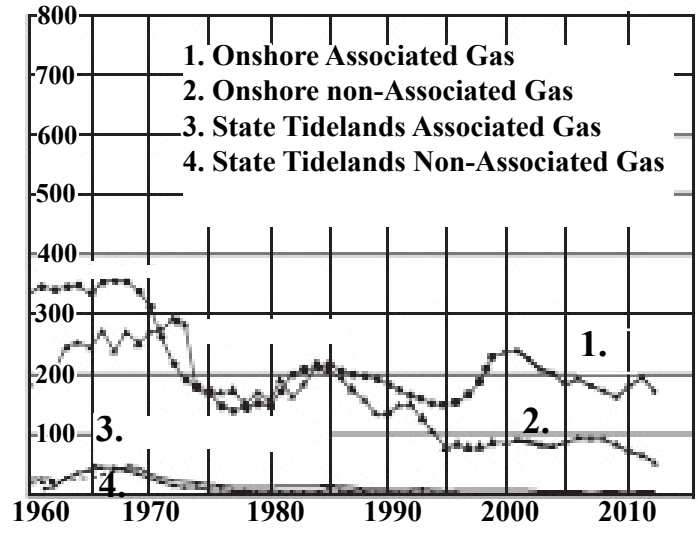


ANNUAL OIL PRODUCTION (million barrels)



CALIFORNIA OIL PRODUCTION

NET GAS PRODUCTION (billion cubic feet)



CALIFORNIA GAS PRODUCTION

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The Northern California Geological Society annually gives graduate-level scholarships to deserving students via the Richard Chambers Memorial Scholarship Program. The program is named for Richard Chambers, a former member of NCGS who made a significant bequest to the Society. NCGS uses funds from the bequest to award students furthering student research in Earth and Environmental Sciences in northern California and adjacent areas. For the 2012-2013 year, a total of \$4000 was distributed between three graduate students.

Applications are now being accepted for 2013-2014 scholarships. (See page 16.)

In 2012-2013, the three students were awarded scholarships:

- **Monica Leopold**, San Jose State University, whose Master's-level research is summarized as "Structure and Construction of the Sonora Pass Intrusive Suite, Sierra Nevada, California." Ms. Leopold's faculty advisor is Dr. Robert B. Miller.
- **William Pilesky**, CSU-Fullerton, whose Master's-level research is "A Paleoceanographic Analysis of Cherty Limestone from the upper Ordovician- lower Silurian Ely Springs Formation, East-central California." Mr. Pilesky's faculty advisor is Dr. Adam Woods.
- **Alexander Steely**, UC- Santa Cruz, whose Doctoral research is "Timing and Magnitude of Rapid Exhumation in the Central Coast Ranges of California: Assessing Complex Uplift along the Plate Boundary." Mr. Steely's faculty advisor is Dr. Jeremy Hourigan.

Fossils

FOSSILS cartoon will return in the next PPG issue.

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NORTHERN CALIFORNIA GEOLOGICAL SOCIETY

**2013-2014 RICHARD CHAMBERS MEMORIAL
SCHOLARSHIPS**

The Northern California Geological Society is pleased to announce the availability of their **Richard Chambers Memorial Scholarships** to help support graduate-level student research in geology during the 2013-2014 academic year. More than one scholarship may be awarded at each academic level.

\$ 1,000 Scholarships will be awarded to students working towards the Masters Degree.

\$ 2,000 Scholarships will be awarded to students working towards the Ph.D. Degree.

These scholarships will be awarded competitively, based upon our review of submitted summaries of proposed research. Funds are intended to support field and laboratory components of research programs. The research should be scheduled for completion during the 2013-2014 calendar years. Winners' may/will be invited to speak or otherwise present their research at a regular NCGS evening meeting in Orinda, California.

Funding priority for these scholarships will be directed to research focused on topics in general geology, geologic mapping, structural, economic, engineering and/or environmental geology, geophysics, stratigraphy, paleontology and/or paleoecology implemented in northern California and/or states immediately adjacent to northern California.

Application Procedure

Candidates may apply by forwarding a signed cover letter on University Department letterhead requesting the award, accompanied by a brief (no more than 2 pages) summary of their proposed research topic. This letter must include candidates contact information (both departmental and home mailing and email addresses, & telephone numbers).

The bottom of the candidate letter must bear this note (filled out):

Degree Program: _____, Approved by: _____, (print): _____,
Title: _____, Telephone: _____, e-mail address: _____, and date: _____.

with the signature and printed name, title, telephone & e-mail of the department chair person or thesis advisor. Please indicate which scholarship (Masters or Ph.D.) you are applying for. No other application form is required.

Please submit your letter and proposal by U.S. Mail postmarked no later than DECEMBER 14, 2013 to:

Phillip Garbutt, Chair
NCGS Scholarship Committee
6372 Boone Drive
Castro Valley, CA 94552-5077

Voice: (510) 581-9098
e-mail: plgarbutt@comcast.net
NCGS website: <http://www.ncgeolsoc.org>
issued: August 23, 2013

Scholarship Awards will be made on or about January 31, 2014

Alaska Geological Society

- September 19 Meeting: "Quaternary Volcanoes in Southeast Alaska;" SPEAKER: Sue Karl, USGS, Anchorage
- October 17, 2013: "USGS Alaska Mapping Initiative;" SPEAKER: Becci Anderson, USGS Geospatial Liaison - Alaska Region

Coast Geological Society

- September 17 Meeting: "Unraveling the Geologic and Tectonic History of Mars;" SPEAKER: Dr. Robert Anderson, Jet Propulsion Laboratory, Pasadena.
- October 4: WOOLLEY GOLF TOURNAMENT/BBQ (see below)

L.A. Basin Geological Society

- No Summer program

Northern California Geological Society

- September 25 Meeting: TBA
- October 30 Meeting: "Paleo-precipitation records from Lake Tahoe cores;" SPEAKER: Dr. David A. Osleger, UC Davis

Northwest Energy Association

- No information provided

Sacramento Petroleum Association

- No Summer Program

San Joaquin Geological Society

- Sept. 13: GOLF TOURNAMENT/BBQ (see below)

**Golf,
BBQ,
Anyone?**



The San Joaquin Geological Society and the Coast Geological Society annually hold golf tournaments, followed by same-day barbecues. These social events are great fun and raise money that funds scholarships given at the end of the academic year. Make plans to sign up for these events!

- This year the SJGS Golf/BBQ event will be held on September 13. Golf will be at Sundale Golf Course in Bakersfield, and the evening BBQ at the Kern County Museum. The event has terrific support from oil-related businesses, and is always looking for more sponsorships. All the information needed to sign up is available on the SJGS website, or contact Kathy Smith (kathysmith@paseis.com) for the golf tournament or Anne Draucker (AnneDraucker@chevron.com) for the BBQ.
- The Coast GS event will be the 15th Annual Woolley Memorial Tournament on October 4. All net proceeds go to the John J. Woolley Memorial Scholarship Fund. This year, it will be held at Elkins Ranch Golf Course in Fillmore, Ca. and will be followed by a Santa Maria-style BBQ. More information can be gained from the Coast GS website or by contacting Tournament Directors Mike Phipps (805) 497-7999, mphipp@cott-shires.com or Phil Kinney prkinney@roadrunner.com.

Alaska Geological Society

www.alaskageology.org

P. O. Box 101288
Anchorage, AK 99510

Contact: Eric Cannon
eric_cannon@golder.com



Luncheon meetings are held monthly September through May, usually on the third Thursday of the month, at the BP Energy Center (1014 Energy Court) from 11:30 a.m. to 1:00 p.m. The hot lunch cost is \$20 for members with reservations; \$22 for non-members with reservations; and \$25 without reservations. The box lunch cost is \$13 for members with reservations, \$15 for non-members with reservations, and \$18 without reservations. For reservations, call the AGS reservation voice mail at 907-258-9059 or contact David Hite at hiteconsult@acsalaska.net by noon on Monday before the meeting.

President:	Matt Frankforter	mfrankforter@hilcorp.com
President-Elect:	Keith Torrance	ktorrance@apcservicesllc.com
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Treasurer:	Alan Hunter	paleoman@mac.com
Past-President:	Ken Helmold	ken.helmold@alaska.gov

Coast Geological Society

www.coastgeologicalsociety.org

P. O. Box 3055
Ventura, CA 93006

Contact: Peter Morris
805.745.2149



Dinner meetings are held monthly September through May, on the third Tuesday of the month, at Poinsettia Pavilion, 3451 Foothill Road in Ventura. Social hour starts at 6:00 p.m., dinner is served at 7:00 p.m., and the talk starts at 8:00 p.m. The cost of dinner with reservations is \$20 (members), \$25 (non-members), or \$10 (students and K-12 teachers); the talk is free. For reservations, please email Bonnie Walters (secretary@coastgeologicalsociety.org), and should be made by 4:00 p.m. on the Friday before the meeting.

President:	Peter Morris	805-745-2149	president@coastgeologicalsociety.org
Past President:	John Harris	805-407-7644	pastpresident@coastgeologicalsociety.org
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Membership:	Nick Kunstek		membership@coastgeologicalsociety.org
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Los Angeles Basin Geological Society

www.labgs.org

515 So. Flower Street, Ste 4800
Los Angeles, CA 90071

Contact: Bill Long
213.225.5900 x 205



Luncheon meetings are held monthly September and October; and January through June, usually on the fourth Thursday of the month, in the Monarch Room at The Grand at Willow Street Conference Centre (4101 E. Willow Street) in Long Beach. Lunch is served at 11:30 a.m., and the talk starts at 12:15 p.m. The cost is \$20 (with reservations), \$25 (without reservations), or \$5 for students. Reservations can be made online at www.labgs.org or by contacting Marieke Gaudet at 562.624.3364 or marieke_gaudet@oxy.com. Reservations must be made prior to Tuesday before the meeting.

President:	Bill Long	213.225.0205	william.long@breitburn.com
Vice President:	Jean Kulla	949.500.3095	k2mobile@.com
Treasurer:	Bert Vogler	562.432.1696	hvogler@kleinfelder.com
Secretary:	Graham Wilson	562.326.5278	Gwilson@SHPI.net

Northern California Geological Society

www.ncgeolsoc.org

9 Bramblewood Court
Danville, CA 94506-1130

Contact: Barb Matz
Barbara.Matz@shawgrp.com



Evening meetings are held monthly September through May, usually on the last Wednesday of the month, at the Masonic Center (9 Altarinda Road) in Orinda. Social hour starts at 6:30 p.m., and the talk starts at 7:00 p.m. (no dinner). For reservations, contact Dan Day at danday94@pacbell.net before the meeting. Cost is \$5 per regular member; \$1 per student member; and \$1 per K-12 teachers.

Continued on next page

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K-12 programs	Paul Henshaw	candphenshaw@comcast.net

Northwest Energy Association

www.nwenergyassociation.org

P. O. Box 6679
Portland, OR 97228-6679

Contact: *Tim Blackwood*
503.656.0156



Breakfast meetings are held monthly September through May, usually on the second Friday of the month, at the Multnomah Athletic Club (1849 SW. Salmon Street) in Portland. Meeting time is at 7:30 - 9:00 am. The cost is \$18. For information or reservations, contact Steve Walti.

President	Tim Blackwood	tblackwood@pacificgeotechnicallc.com
Treasurer	Steve Walti	steven.walti@nwnatural.com

Sacramento Petroleum Association

P. O. Box 571
Sacramento, CA 95812-0571

Contact: *David Hartley*
530.304.4277



Luncheon meetings held monthly January through November, on the third Wednesday of the month. Location: Club Pheasant Restaurant in West Sacramento. The meetings starts at noon. The cost is \$16 - \$20. For information or reservations, contact Pam Ceccarelli.

President:	Jerry Reedy	916.486.2643	JWR5532@aol.com
Vice-President:	David Hartley	530.304.4277	drilmax1@aol.com
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Editor/Treasurer	Pam Ceccarelli	916.439.0400	pc626@comcast.net

San Joaquin Geological Society

www.sanjoaquingeologicalsociety.org

P. O. Box 1056
Bakersfield, CA 93302

Contact: *Vaughn Thompson*
vaughn_thompson@oxy.com



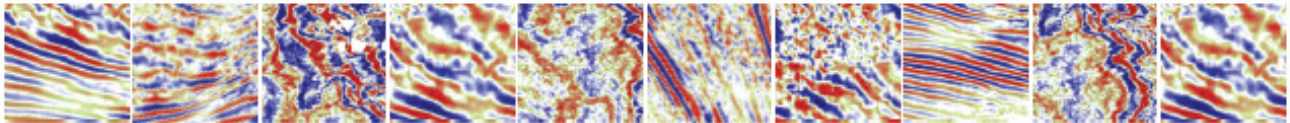
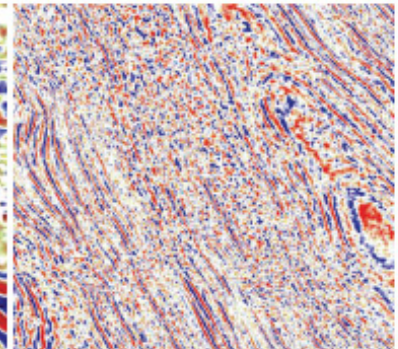
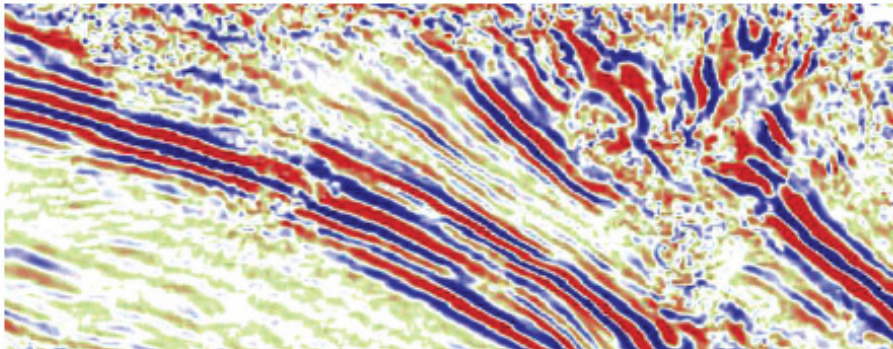
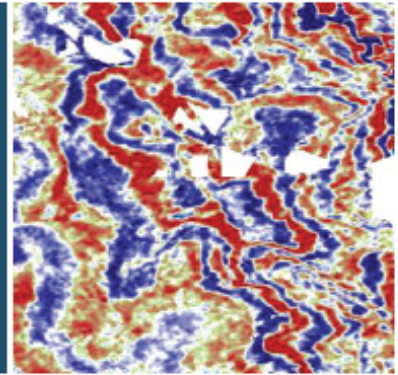
We have dinner meetings on the second Tuesday of the month at the American Legion Hall at 2020 "H Street" in Bakersfield. There is an icebreaker at 6:00 pm, dinner at 7:00 pm, and a talk at 8:00 pm. Dinner is \$25.00 for members with reservations and \$30.00 for nonmembers and members without reservations, and the talks are free.

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