NORTHERN CALIFORNIA GEOLOGICAL SOCIETY

NCGS Newsletter Editor:
Dan Day: danday94@pacbell.net

NCGS Voice Mail: **925-424-3669**

NCGS OFFICERS

President:
Randy Kirby
rkirby.geosci@usa.net

***President-Elect*:**
Mark Detterman
mdetterman@blymyer.com

Field Trip Coordinator:
Jean Moran:
jeanm@stetsonengineers.com

Treasurer:
Phil Reed: philecreed@msn.com

Program Chairs:
Mark Detterman
mdetterman@blymyer.com

John Karachewski:
JohnKarachewski@sprintmail.com

Scholarship: open

K-12 Programs: open

COUNSELORS

Programs:

Ron Crane
roncrane@aol.com

Barbara Fletcher:
efletcher@loving-campos.com

Don Lewis: donlewis@attbi.com

Frank Picha: afpicha@pacbell.net

Ray Sullivan:
sullivan@lucasvalley.net

Field Trips:

Tridib Guha: aars@earthlink.net

MAY MEETING ANNOUNCEMENT

DATE: **Wednesday, May 15, 2002**

LOCATION: **Orinda Masonic Center, 9 Altarinda Rd., Orinda**

TIME: **6:30 p.m. Social; 7:00 p.m. talk (no dinner)**
Cost is $5.00 per person

RESERVATIONS: Leave your name and phone number at 925-424-3669 or at *danday94@pacbell.net* before the meeting.

SPEAKER: **Dr. James A. Harrell, The University of Toledo**

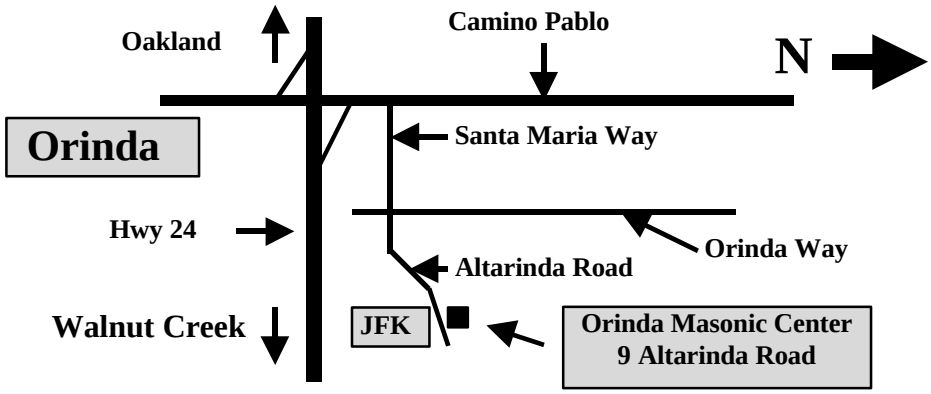
Archaeological Geology in Egypt: Ancient Oil Wells and Mummy Bitumen, Earliest Geological Map, First Paved Road, Pyramid Temple Pavements, and the Sphinx Age Controversy

The NCGS is exceptionally fortunate to have as its May 2002 speaker a researcher experienced in the field of archaeological geology. Dr. James Harrell has spent over a decade studying key archaeological sites of ancient Egypt and Sudan. He has skillfully applied geological concepts to solve complex archaeological problems in an area renowned for its rich archaeological heritage.

Ancient Egypt had a highly advanced society over 4500 years ago, and was one of the truly great civilizations of mankind. The NCGS invites its members to bring family and friends to this meeting. It will be a rewarding experience for those intrigued by ancient cultures and archaeological pursuits. It is a unique opportunity to learn first hand from an expert in a discipline that melds geology with archaeology.

Details of Dr. Harrell's AAPG Distinguished Lecture are presented on the next page of the newsletter. A map to the Orinda Masonic Center is on the back page of the newsletter. If you need directions, please contact Dan Day at 925-424-3669.

Don't miss this exciting venture into the world of the Pharoahs!



Northern California Geological Society
c/o Dan Day
9 Bramblewood Court
Danville, CA. 94506-1130

Would you like to receive the NCGS newsletter by e-mail? If you are not already doing so, and would like to, please contact **Dan Day** at danday94@pacbell.net to sign up for this service.

2001-2002 AAPG Distinguished Lecture

Archaeological Geology in Egypt: Ancient Oil Wells and Mummy Bitumen, Earliest Geological Map, First Paved Road, Pyramid Temple Pavements, and the Sphinx Age Controversy

JAMES A. HARRELL
The University of Toledo
Toledo, Ohio

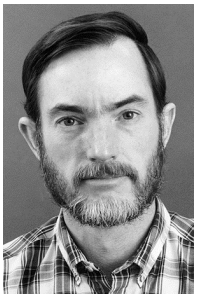
Broadly defined, the discipline of Archaeological Geology is concerned with the application of geologic concepts and methods to archaeological objects and sites. Ancient Egypt provides especially fertile ground for the archaeological geologist and this will be illustrated with four examples from the speaker's research. The first of these looks at the archaeological context of an ancient quarry, the second is concerned with the history of geology, the third employs a sophisticated analytical technique to solve an archaeological problem, and the fourth considers the geologic evidence at the center of an archaeological controversy.

(1) Basalt was employed for pavements in several Old Kingdom pyramid temples built between 2625-2250 BC. It was used to symbolize the black, organic-rich soil of the Nile floodplain, without which Egyptian civilization would not have been possible. So important was this soil that the ancient Egyptians named their county after it: *kemet*, meaning the "black land". Although the basalt pavements were recognized long ago, the quarry for the stone was only recently identified, and in finding it an even greater discovery was made: the world's oldest paved road. The quarry is in an Oligocene basalt flow at the northern edge of the Western Desert's Faiyum Depression. A nearly 12-km long road, paved with stone slabs and dating to the Old Kingdom, was built to service different parts of the quarry and facilitate the removal of basalt to a quay on the shore of a now evaporated lake. The basalt was loaded onto barges and carried across the lake to where it joined the Nile River, a connection possible only during the river's annual summer flood.

(2) Texts on the History of Geology usually say the first geologic map dates to the mid-1700's, but actually the oldest one was made 2900 years earlier in Egypt. It was drawn on a papyrus scroll about 1150 BC and documents a quarrying expedition sent by king Ramesses IV to Wadi Hammamat in the Eastern Desert. Here Precambrian metaconglomerates, metagraywackes and metasiltstones were quarried. The latter two rock types were the ancient Egyptian *bekhen*-stone and this name has come down to us today, via Greco-Roman transliterations and a medieval transcription error, as the familiar "basalt". The papyrus map shows Wadi Hammamat, other connecting wadis and the surrounding mountains, the *bekhen*-stone quarry, and a gold mine. It also has several short texts indicating the presence of gold in various parts of the map area, and it uses different colors for the two main rock types and in so doing shows their areal distributions. Besides being a geologic map, the papyrus is also one of the oldest known topographic maps in the world.

(3) The bitumen used as a preservative in some ancient Egyptian mummies was previously thought to come only from the Dead Sea area in Palestine. A closer source of bitumen was investigated at Gebel Zeit on the southwestern shore of Egypt's Gulf of Suez. Here two ancient oil wells were discovered. These were hand-dug in Pleistocene reef limestone and fed by petroleum seepage along a fault. Bitumen samples from the Dead Sea, Gebel Zeit, another site in the Gulf of Suez, and five mummies were analyzed using molecular biomarkers derived from gas chromatography/mass spectrometry. It was found that four of the mummies contained Dead Sea bitumen, and the fifth and oldest one (that of the Libyan Pasehor from about 900 BC) had bitumen from Gebel Zeit. This is the first evidence for the use of an indigenous source of bitumen in ancient Egypt.

(4) For the past several years, there has been a heated controversy regarding the age of the Great Sphinx, one of Egypt's best-known icons. This giant, human-headed lion was carved out of the Eocene limestone bedrock of the Giza Plateau. Archaeologists date it to the reign of king Khafre (2520-2494 BC), whose pyramid sits behind it, but two media-savvy outsiders, one of whom is a geologist, say that it must be several thousand years older based on its weathering characteristics. It will be argued that the geological evidence supports the conventional 2500 BC age.



Dr. James A. Harrell received his B.A. in Earth Science from California State University, Fullerton (1971), his M.S. in Geology from the University of Oklahoma (1976), and his Ph.D. in Geology from the University of Cincinnati (1983). Since 1979 Dr. Harrell has been a faculty member in the Department of Earth, Ecological, and Environmental Geosciences at the University of Toledo. He is currently a Full Professor and was Department Chair from 1985-1994. Since 1989 he has made 22 field trips to Egypt and northern Sudan, and has been Geoarchaeology Consultant to the Egyptian Geological Survey and Mining Authority since 1994. For the last 7 years he has been Site Geologist for the excavations of Berenike, a Greco-Roman site on Egypt's southern Red Sea coast. Dr. Harrell's professional interests include sedimentary geology, statistical applications in geology, geologic hazards, and the archaeological geology of ancient Egypt. He is a member of the National Association of Geoscience Teachers (NAGT), Sigma Xi, the Association for the Study of Marble and Other Stones in Antiquity (Secretary and Treasurer), the Archaeological Institute of America (President of the Toledo chapter), the Sudan Archaeological Research Society, and the Egypt Exploration Society.

NCGS 2002 Calendar

Wednesday, May 15, 2002 AAPG Distinguished Lecture
James Harrell, *The University of Toledo, Toledo, Ohio*
"Archaeological Geology in Egypt: Ancient Oil Wells and Mummy Bitumen, Earliest Geological Map, First Paved Road, Pyramid Temple Pavements, and the Sphinx Age Controversy"
Orinda Masonic Center

Saturday, May 18, 2002 Field Trip
Ron Crane, Consultant, and ***Craig Lyon***, retired Chevron
"Structure and Geology of Mount Diablo"
See flyer in this newsletter.

Wednesday, June 26, 2002
John Karachewski, Weiss Associates
"California Geoscapes" A photo journal of California geological scenery.
Orinda Masonic Center

In the Works…

The following field trips are being pursued, but have not been finalized! Watch future newsletters for details.

Rogers Creek/Maacama Fault Zones	Bob McLaughlin, USGS	Fall 2002
Hayward Fault Trench Field Trip	Jim Lienkaemper, USGS	October 12, 2002
Pacheco Pass Field Trip*	Gary Ernst, Stanford University	Fall 2002

*(pending results of knee/hip surgery)

Bay Area Geophysical Society

Joel Walls of Rock Solid Images in Houston, TX will talk about ***"Well Logs Are Not Rocks."*** The talk will is set for **June 5, 2002**

Mike Wilt of EMI/Schlumberger in Richmond, CA will talk about ***"Crosswell Electromagnetics in a Production Environment."*** The talk will is set for **June 20, 2002**

John Etgen of British Petroleum in Houston will talk about ***"High-end Imaging for Exploration and Development."*** Exact title TBA. The talk will be sometime this summer or fall. Please check back later for more details.

Jon Claerbout of Stanford University is tentatively scheduled to speak.
Exact title TBA. The talk will be sometime this summer or fall. Please check back later for more details.

Oz Yilmaz of Anatolian Geophysics in Turkey will talk about ***"A Unified 3-D Seismic Workflow."***
Please check back later for more details.

The **SEG Fall Distinguished Lecture** for the Autumn 2002 will be delivered by Stanford Professor **Jerry M. Harris.** The title of his talk is ***"Crosswell Seismic Profiling: The Decade Ahead."***
Exact time and date TBA.

Please check the BAGS website at **http://sepwww.stanford.edu/bags/** *for meeting updates.*

A Sequence Stratigraphic Interpretation of the Domengine Formation, Black Diamond Mines Regional Preserve

On April 6th the NCGS hosted a field trip to Black Diamond Mines Regional Preserve. Unlike its annual Fall Teachers Day event, this function was planned to discuss the paleoenvironmental conditions under which the Eocene coal-bearing Domengine Formation was laid down. This excellent discussion of the sedimentary processes that molded the deposits exposed at Black Diamond Mines was expertly led by the father-son team of Dr. Ray Sullivan of San Francisco State University and his son Morgan, employed by ExxonMobile Upstream Research Company in Houston, Texas. They were joined by East Bay Regional Parks District mining experts John Waters and Rick Yarborough, who guided members through the maze of underground tunnels. This trip to the Preserve was arranged to present a sequence stratigraphic interpretation of the Domengine Formation that provides a new paleoenvironmental interpretation of its origin.

The Black Diamond Mines region has a rich history. Mining began in 1855 after a local rancher discovered lignite coal while digging on his property. The mining operations grew rapidly, and by the 1870's, the industry supported 12 mines, 5 settlements, 900 miners, and 3 railways for transporting the coal to docks in Pittsburg. Coal mining declined after 1885, when a better grade coal source was found in Washington State. By 1902, commercial coal production at the mines essentially ceased. In the 1920's businessman Marvin Greathouse began mining Domengine sand in the Preserve to feed an Oakland glass factory. This also ended after World War II, when cheaper Belgian glass sand used as ship ballast replaced the Black Diamond Mines source. The region is now part of the Black Diamond Mines Regional Preserve, where the East Bay Regional Parks District staff researches its community history, maintains the mining operations, and characterizes wildlife habitats.

Ray and Morgan Sullivan gave a brief introduction to the sedimentary features used to denote various paleoenvironmental interpretations of sedimentary deposits. It is important to note that it is only within the last 30 years that any concerted effort was made to define sedimentary environments based on the spatial and temporal distribution of the associated bedforms, lithologic units, and sedimentary facies. A key exploration tool refined by petroleum geologists in their search for hydrocarbon deposits is sequence stratigraphy. It is the study of genetically-related facies (time-equivalent strata) bounded by meaningful chronostratigraphic (time significant) surfaces. Facies refers to time-equivalent sediments of different lithologic composition, and a sequence is defined as a succession of relatively conformable, genetically-related strata bounded by unconformities or their correlative conformities. Sequences are composed of parasequences and parasequence sets (a succession of parasequences). Sequence boundaries form in response to relative falls in sea level, whereas parasequences and parasequence sets are bounded by marine-flooding (transgressive) surfaces. Parasequences are comprised of distinctive stacking patterns, or successions of sedimentary layers which can differ in composition, grain size, and bedform (structural) characteristics or any combination thereof. It is the association of the various compositional, textural, and structural features of a sedimentary unit over time that can be used to describe the environment where it was formed. The sedimentary environment and its regional architecture are extremely important in defining the reservoir, source rock, and seal layer distribution of an oil field.

After Morgan completed his description of various nearshore marine environments and the sedimentary features that distinguish each, it was time to tour the mine to see the features exposed in the tunnel walls. The trip's focus was on the Eocene Domengine Formation, a widely recognized unit in the California Coast Ranges that correlates in part with the Ione Formation on the eastern margin of the Sacramento Valley. It is part of the early Tertiary sedimentary strata totaling 6500 feet in thickness at Black Diamond Mines on the northeastern flank of Mount Diablo. The core of this structure is Coast Range ophiolite (sea floor basalt/sediment assemblages) and Franciscan Formation. The sediments mantling this core complex contain radiometric-dated tephra (volcanic ash) layers that confine the uplift of Mount Diablo to less than 3 million years. Other structural evidence suggests a much more recent time interval than this. Although previous investigators interpreted the massif as a piercement structure, NCGS member Ron Crane and others propose an eastward underthrusting (wedge-backthrust) uplift associated with accretionary plate motion along a basal detachment surface (decollment) as the emplacement mechanism. Unruh and Sawyer (1995) offer a third option, a restrained compressive (transpressional) origin caused by step over transfer of dextral (right lateral) strike-slip motion from the Greenville fault southeast of Mount Diablo to the Concord fault on its northwest flank. This uplifting action, whatever the source, produced the prominent strike-aligned sandstone ridges and intervening eroded shaley valleys dipping steeply to the northeast. This series of ridges is one of the best continuous exposures of Tertiary sediments in the East Bay. The extensive tunnel network provided Ray and his coworkers a unique opportunity to characterize the paleoenvironment and sequence stratigraphy of the Domengine Formation.

The Mesozoic-early Tertiary time had been dominated by a forearc basin in the Sacramento-San Joaquin Valley (Graham et.al., 1984), bounded n the west by an active trench-subduction zone complex. The shoreline of this basin was along the current Sierran foothills. During the

Tertiary, plate tectonic dynamics shifted from a quiescent volcanic period early to a renewed volcanism as plate motion shifted to a transform mechanism in late Tertiary times. Large submarine canyons were periodically cut into the shelf sediments during sea level lowstands. The Meganos Canyon underlies the southern Black Diamond Mine Preserve and denotes the slow change from a warm, moist subtropical Eocene climate to subsequent cooler, drier conditions in later times. The Domengine Formation flanking Mount Diablo can be traced eastward into the subsurface, where it forms a substantial gas reservoir in the southern Sacramento basin. It lies unconformably on top of underlying strata, and when traced westward, it truncates progressively older lower Tertiary formations until it rests on upper Cretaceous rocks. The early (lower) Tertiary sediments in this area total over 6500 feet thick and comprise a series of transgressive-regressive cycles. Units include nearshore sands, deep water marine mudstones, and slope turbidites. The Domengine has been interpreted by previous investigators as lagoonal and barrier-beach strata deposited on a north-south trending shoreline. Ray and Morgan's work, however, which integrates outcrop and subsurface data, indicates a northeast-southwest trending series of incised estuarine valleys oriented almost perpendicular to the prior model as the likely depositional environment. This interpretation has a critical effect on potential petroleum reservoir location in the subsurface Sacramento Valley.

The group was led on a tour of the mine by East Bay Regional Parks District mining experts John Waters and Rick Yarborough. Their description of the mining operation was accompanied by geological commentary from Ray and Morgan. The mine excursion clearly illustrated sedimentary features exposed in the drift walls that allowed one to construct a paleoenvironmental model of Eocene conditions at Black Diamond Mines. The bed forms noted in the sediments included mud-draped sigmoidal crossbedding, fining upward sequences, ripple marks, and limited *Ophiomorpha* trace fossil burrow bioturbation. The stacking sequence and three-dimensional arrangement of these sediments are consistent with an estuarine environment fluctuating between high-energy tidal conditions and relatively still-water slack periods that allowed fine muddy layers to deposit atop the sandier bed forms. Although much of the Domengine displays features akin to both estuarine and barrier bar-beach environments, these estuarine systems are oriented parallel to incised coastal valleys that are themselves situated perpendicular to the regional coastline trend.

After the mine tour, the group assembled in a nearby picnic area to partake of a delicious salmon and chicken barbecue prepared by the now legendary Tridib and Mita Guha. Tridib is a former Conoco Oil employee transplanted to the Bay Area from Houston. He is currently principal of Advanced Assessment and Remediation Services in Concord, CA. In Houston he organized many successful field trips for the local geological society. His considerable expertise has been displayed in recent years at the annual NCGS Teachers Day functions held each October at Black Diamond Mines to mark national Earth Science Week. He also plays a key role in helping to plan logistics for NCGS field trips.

Lunch was followed by a vehicle caravan excursion eastward across the Preserve to examine many of the features that had been pointed out earlier in the subsurface. The Domengine at Black Diamond Mines represents the lower of two sequences that constitute the formation. Sequence 2, missing at the mines, occurs in the subsurface to the east. The group drove up the road from Somerville to Nortonville to the east, passing Rose Hill cemetery, and descending the ridge to the next valley at the mouth of Coal Canyon. Following this canyon to the south, the contact (transgressive surface 1) between the upper (marine shales) and lower members of the Domengine can be seen. Channelized subtidal sandstones of the lower member are exposed at the canyon mouth, and the Clark coal vein crops out about 70 feet below this contact. The upper member coarsens upward into tabular sandstone beds. Ray took the group to a nearby outcrop that showed the contact between the Domengine and the overlying Nortonville Shale, which forms the valley between the Domengine ridges and the more resistant sandy layers of the ridge-forming Markley Formation to the south. The Domengine-Norton transition marks a major flooding event and a rapid return to bathyal conditions in the area. Time constraints forced the caravan to make the next stop at the western end of the preserve its last. There Ray and Morgan discussed the exposed unconformity between fluvial conglomerates of the basal Domengine and the underlying lower Eocene Meganos "C" shale.

The NCGS is deply indebted to long-time member Dr. ray Sullivan of San Francisco State, and his son Morgan, for presenting a look at ther detailed stratigraphy of the Domengine Formation at Black Diamond Mines Regional Preserve. Ray has devoted a significant portion of his 40-year study of the Tertiary units exposed in the Preserve to characterizing their paleoenvironments. The advent of sequence stratigraphic concepts helped him determine that the Domengine was laid down under estuarine rather than barrier bar-beach conditions. This revelation has significant implications for subsurface gas exploration efforts in the Sacramento Valley east of the Coast Ranges. Ray has long been assisted in his work by Regional Parks District mining expert John Waters. John and assistants like Rick Yarborough, have painstakingly restored the mines and converted them into a unique classroom for illustrating mining techniques to the public. The NCGS also thanks Phil Reed, Ron Crane, and Dan Day for helping Tridib and Mita Guha with the barbecue. Ron supplied expert commentary on the regional geology of the area to tie in with the local geology at Black Diamond Mines.

An Introduction to Carbonatite Volcanism in Central Wyoming Presented at the April 24th NCGS Meeting

On April 24th, NCGS member John Gabelman, a local geological consultant who has spent his professional career in mineral exploration and mining, spoke on what he has interpreted to be a unique exposure of carbonatite volcanism in central Wyoming. His talk *"Hydrous Carbonatite(?) Volcanism in Central Wyoming"* presented for the first time the results of several years of work that John and his co-worker Edward D. Finch have been doing in the Sweetwater basin of central Wyoming. John is an expert on uranium deposits, having spent 25 years of his career working for the Atomic Energy Commission characterizing uranium districts in the Colorado Plateau and Rocky Mountains. He is extensively published on this topic. His search for the source of uranium in the rich sedimentary deposits of central Wyoming basins led him to explore these unique uraniferous carbonates.

Carbonatites are rare carbonate deposits of igneous origin that only recently drew the attention of petrologists. Although know to exist since the early 1920's, carbonatites became a topic of interest as plate tectonics experts began noting their association with continental rift systems. The latter is for all intents confined to the unique volcanism of the East African rift system with particular emphasis on the singular sodium carbonate-bearing alkali volcanism of Oldoinyo Lengai in northeastern Tanzania (Tanganyika). Carbonatites are carbonate-bearing (calcite, dolomite, ankerite (a calcium iron carbonate)) igneous rocks with minor apatite (calcium phosphate), magnetite, and alkali silicates. The igneous features as well as unique rare earth element and uranium-thorium concentrations distinguish them form conventional sedimentary carbonate deposits. They are closely related to kimberlites, the ultra-potassic diamond-bearing igneous rocks that occur in tectonically stable continental cratons. The kimberlite form narrow (a few thousand meters diameter) apparently explosive pipes or inverted conical diatremes, whereas carbonatites generally form cylindrical plug-like intrusives a few kilometers across. Carbonatites represent the last stage of alkali igneous activity associated with silica undersaturated rock suites like syenites, nephelinites, basanites, and other unique alkali intrusives. These intrusives range from Precambrian to Recent in age, although the majority were intruded in Mesozoic times (65 to 225 m.y. ago). Two key domestic carbonatite deposits are located at Mountain Pass, California, and at Magnet Cove in Arkansas. The Mountain Pass site is a major rare earth element resource with applications in the specialty glass and television tube industries. A brief introduction to carbonatites and kimberlites can be found at the website **http://geology.csupomona.edu/drjessey/class/GSC433/Kimberlites.htm**.

The suite of carbonates that caught John's eye is peculiar in that the deposits do not follow regional bedding nor local structures. In many ways they resemble the Hopi Buttes diatremes in northeastern Arizona. The 29 exposures are scattered throughout the Sweetwater basin, a rift structure associated with tensional wrench faulting generated by the post-Laramide collapse of the Granite Mountains uplift in the Miocene. The basin collapse apparently facilitated emplacement of these carbonate deposits as small (<30 meters) pipes and flows or sills capping small mesas (<300 meters). The carbonates are Pliocene or younger in age and appear to be associated with wrench or tensional faults, ring structures, and soda lakes. There is no evidence of sedimentary bedding or fossils. Internally the rocks reveal macro-flow textures, healed brecciation, and over five generations of veining. Microscopic examination shows xenolith (alkalic and felsic rock affinities) and xenocryst (quartz, plagioclase, and sanidine feldspar) inclusions as well as rounded and resorbed nodular silica masses. Mineralogical analysis indicates the latter to be amorphous or to contain poorly crystalline cristobalite, a polymorph of quartz. Some of the pipes John examined show a long paragenetic sequence that ranges from igneous intrusion through a deuteric alteration stage, and culminating with hot spring type hydrothermal activity marked by jasperoid and travertine deposits.

Geochemical indicators supporting an igneous origin of the carbonate bodies are high uranium, thorium, rare earth element, and phosphorus contents. Each locality has a different rare earth element pattern, but the similar petrology and paragenetic histories of the deposits call for an identical magmatic source(s). Compositional constraints suggest the latter to be a carbonatite fluid.

Ironically, one of the audience members, Bill Motzer of Todd Engineers, is a former Molycorp geologist who spent ten years working on the Mountain Pass rare earth element deposit in San Bernadino County. Bill felt that John's initial conclusions about these carbonates are correct, and that what he may be looking at is the upper level of an igneous complex resembling Mountain Pass at depth.

The NCGS sincerely appreciates John's willingness to share his research of this unique igneous complex with its members. The April 24th audience was the first to hear him tell about this discovery. Future work will hopefully reveal even more about these carbonatites and the source rocks that lie beneath them.

California Council of Geoscience Organizations (CCGO) Dinner

http://www.ccgo.org

"Geology, Wine and People of the Napa Valley - a Preview of a forthcoming book by: Jonathan Swinchatt and David Howell"

Wednesday June 5, 2002

One hundred and fifty million years ago, most of what we now call California did not exist. Since then, a series of complicated earth events have plastered material onto the edge of North America and formed it into its present, momentary, configuration. In California, a number of Pacific Ocean plates have interacted with the western edge of the continent, creating the rugged topography that characterizes the Coast Ranges and the valleys they enclose. It is these processes that have created Napa valley. In spite of periodic reminders provided by movement along the San Andreas Fault and its various offshoots, the present continental configuration has the illusion of permanence, as if it will remain the same forever. It is, of course, continually changing, on a variety of time scales. Some processes are slow - soils may take tens or hundreds of years to evolve fully, mountains rise and erode in increments of millimeters or centimeters per year, continents move only slowly. But small increments lasting over extended periods have major effect on the character of Earth's surface. As we will see, processes on a variety of time scales have created the rocks, the landscape, the sediments, and the soils that support and nourish the grapevines. It is impossible to fully understand or appreciate the character of this region without some knowledge of its geological context and the processes that have made it what it is. As geologist/winemaker Davey Jones of Lava Cap Winery has said, "What you're tasting in a bottle of wine is 100 million years of Earth history."

The wines we will taste (blind) come from the same grape but from different vineyards with different soils, different bedrocks, different climates. Why on Earth are they different?

DINNER ARRANGEMENTS

This dinner will be held at the Old Spaghetti Factory, 62 Jack London Square in Oakland (510-893-0222). The Old Spaghetti Factory is located on Embarcadero, between Webster and Franklin Streets on the Oakland inner harbor. You may park in front of the restaurant, which will validate parking for one hour. Jack London Square can also be reached via the San Francisco – Oakland Ferry, which docks several blocks away.

6:00 – 6:45	No-host social and registration	7:00 – 8:00 Dinner
6:45 – 7:00	Introduction and wine tasting	8:00 – 9:00 Presentation and Questions

RSVP REQUIRED !!!

Please FAX (preferred) or mail by May 30, 2002
John A. Karachewski @ Weiss Associates
Lawrence Livermore National Laboratory
L Code 530, Livermore, CA 94550
OFFICE: (925) 424-5063 FAX: (925) 424-3155
e-mail: karachewski1@llnl.gov

Name:
Firm:
Phone:
No. in party:

Dinner entree: spaghetti with meat sauce
Dinner costs $35 with tasting of 6 wines
Dinner costs $25 without wine
Student rate $15

Call in cancellations by May 30; sorry but no shows will be billed

Please make checks payable to: California Council of Geoscience Organizations

GRA LEGISLATIVE SYMPOSIUM & LOBBY DAY

"Sustaining Groundwater Resources: A Critical Vision"

Sheraton Grand - Sacramento
Tuesday, May 21, 2002

Web Announcement with Registration Options: **http://www.grac.org/savethedate.html**

SYMPOSIUM AGENDA

8:00 -- Registration - Exhibit area

8:30 -- Welcome Address and Overview

Tim Parker, Legislative Committee Chair and Immediate Past President

9:00 -- Legislators' Increasing Awareness of Groundwater Issues: They are starting to care…

Honorable Carol Liu, Chairwoman, Assembly Select Committee on Groundwater

9:30 -- Groundwater - Politics of Policy

What is being decided this year that GRA members care about?

Before meeting with your legislators, receive updates on pending Legislative processes including AB 599 Groundwater Monitoring Taskforce, Updates to Bulletin 118, and pending legislation that will affect our groundwater resources and industry.

11:00 -- What Role Can GRA Play in Focusing the Policy Debate?

Learn the ins and outs of the Legislative process and how GRA members and organizations can protect groundwater resources through effective education and advocacy within the legislature.

11:45 - 12:45 -- Lunch ~ What Role should the Legislature Play in Shaping the Future of Groundwater Resource Management and Sustainability? What is the Long Term Plan?

1:00 - 5:00 Lobby Visits

Meet with Key Water Policymakers as well as your local legislators to advocate for GRA issues. (Please contact us if you would like to have a specific legislative meeting - or if you have set one up yourself)

4:00 - 5:00 -- GRA Groundwater Briefing for Legislative Staff

5:00 - 7:00 -- Legislative Reception and Debrief

For more information, visit www.grac.org or contact Jennifer Carbuccia at: (619) 702-6100 or e-mail: **jcarbuccia@hatchparent.com.**

GRA LUNCH WITH SENATOR MACHADO

May 21, 2002, at the Sheraton Grand, Sacramento

Groundwater is a crucial component of California's water supply, helping to sustain its growing population and economy. Recently, the Legislature has become more active in an effort to protect and manage groundwater. One of the most dedicated legislators in this arena is Senator Mike Machado, who represents Sacramento and San Joaquin Counties. Please join us to hear Senator Machado discuss his SB 1938, currently pending in the Senate and hear his views on the role the Legislature should play in shaping the future of groundwater resource management. GRA is sponsoring a separate lunch as part of the Annual Legislative Symposium and Lobby Day (http://www.grac.org/legday.html) and is delighted that Senator Machado has agreed to be our luncheon speaker and hear what GRA has to say on the issues.

Senator Machado has been a long-time champion of groundwater issues. He authored Proposition 13, served as chair of Assembly Water Parks and Wildlife while in the Assembly, and is currently a member of the Senate Agriculture and Water Committee. Senate Bill 1938 increases the requirements for a groundwater managment plan as currently defined under state law and conditions eligibility for state funding on the preparation and implementation of such a plan. Come hear Senator Machado and decide for yourself whether the new law will help or hinder the future of groundwater management of California.

Cost of Lunch: $40 for GRA members & $50 for nonmembers

For more information or to register, please visit our web site at http://www.grac.org/legday.html or contact Jennifer Carbuccia at: (619) 702-6100 or e-mail: **jcarbuccia@hatchparent.com**.

NORTHERN CALIFORNIA GEOLOGICAL SOCIETY

Mount Diablo Field Trip

Saturday, May 18, 2002

Led by Ron Crane, Consultant and Craig Lyon

The field trip will begin in Walnut Creek and proceed east to Lone Pine Way and then back along Marsh Creek Road through the Upper Cretaceous section. The trip will then proceed up North Gate Road to a lunch stop at Rock City. The afternoon will consist of several geological stops up the mountain where the geology will be discussed at each view stop. The trip will conclude at the top. Attendees are encouraged to actively participate in the technical discussions at trip stops.

The number of participants will be limited to 30 and to NCGS members only.

Time: **Saturday, May 18, 2002**

Departure: **Cal State University Hayward Contra Costa Campus, Ygnacio Valley Blvd., Walnut Creek, at 7:30 a.m. *sharp!***

Directions: Take Ygnacio Valley Road east through Walnut Creek and continue on it for 2.5 miles east of the Ygnacio Valley Road and Oak Grove intersection in Walnut Creek. The main entrance to Cal State University Hayward is at the intersection of Campus Drive and Ygnacio Valley Road (just past the tall white smokestack on the left). Turn right and follow the signs around to the left to student parking.

Cost: **$35 (NCGS members only, please)**. Includes guidebook, transportation, lunch, and beverages.

********** REGISTRATION FORM **********

Name _____

Address (Street/City/Zip) _____

Phone (day) _____ **Phone (evening)** _____

E-mail or Fax No. _____

Please indicate (check) if you are a nonmember _____

Regular Lunch _____ **Vegetarian Lunch _____** (Please check one)

I am willing to drive a rental van or my SUV _____ (check if YES) Mileage will be paid by the NCGS.

Please write a check to the NCGS and mail it with the completed registration form to:

Jean Moran, P.O. Box 1861, Sausalito, CA. 94966.

RSVP's and trip fees must be in by May 11th.

If you have any questions or need additional information or clarification of trip policy, e-mail Jean Moran at **jeanm@stetsonengineers.com** or call her at **415-331-6806** (evenings)