NORTHERN CALIFORNIA GEOLOGICAL SOCIETY

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NCGS OFFICERS

MEETING ANNOUNCEMENT

DATE: **Wednesday, February 25, 2004**

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

TIME: **6:30 p.m. Social; 7:00 p.m. talk (no dinner)**
Cost is $5 per regular member; $1 per student member

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

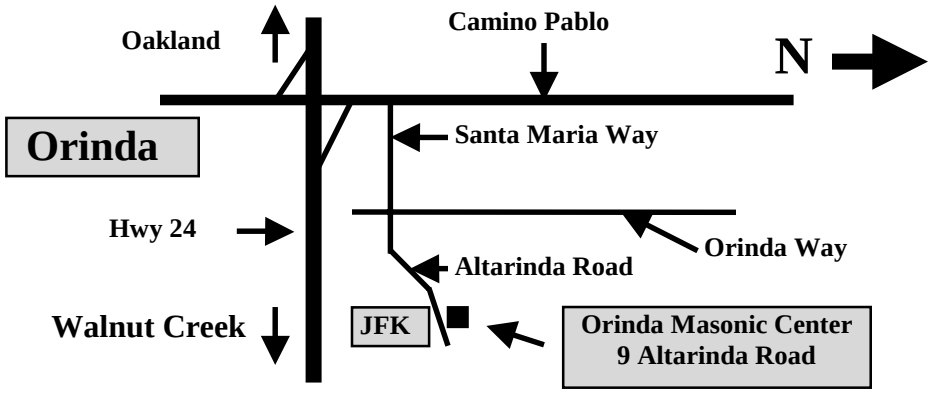
Speaker: Dr. Nahum Schneidermann
ChevronTexaco Overseas Petroleum

Global Gas

Dr. Schneidermann will share with us his "musings of a geologist" on the global gas situation. He will discuss the distribution of global reserves, as well as other geological and business aspects of the unique field that has become the global gas business.

Dr. Nahum Schneidermann received his PhD in geology from the University of Illinois in 1972 and after teaching at the University of Puerto Rico, joined Gulf Oil in 1974 where he held various technical and managerial positions. After Gulf was bought by Chevron, he joined Chevron Overseas Petroleum Inc. as Manager of Basin Studies and Geochemistry. Since 1995, he has been the Manager of International Technical Relations and as such, has been Chevron's primary interface with the International AAPG and World Energy Conferences. He is on of the world's experts on the distribution of global gas reserves. During his years working on regional geology and basin analysis, he maintained maps that were focused on reserves, both oil and gas. He has maintained this data base ever since, and publishes within ChevronTexaco, annual updates of these data.

Meeting Location



Have you Renewed Your Membership?

Northern California Geological Society
c/o Mark Detterman
3197 Cromwell Place
Hayward, CA 94542-1209

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.

NCGS 2003-2004 Calendar

Wednesday March 31, 2004
Dr. Judd Case, Dean of Science, Saint Mary's College, Orinda
Expedition to Antarctica (in Search of Cretaceous Fossils)-December 2003
7:00 PM at Orinda Masonic Center

Monday April 5, 2004
Dr. Richard Behl, AAPG Distinguished Lecture
Miocene Monterey Formation of California: Plankton to Petroleum Source to Reservoir
1:00 PM at ChevronTexaco, San Ramon, Conference Room D2193

Wednesday April 28, 2004
John Stockwell, NCGS
The Formation of Thundereggs
7:00 PM at Orinda Masonic Center

Upcoming Meetings of Interest – Association of Engineering Geologists

Tuesday March 9, 2004
Student Night with Dr. John Williams (Three Student Presentations)
Sinbad's, San Francisco

Tuesday April 13, 2004
Donald Wells, Geomatrix Consultants
Location of the Hayward Fault at UC Berkeley's Memorial Stadium
Location TBA

Contact Chris Hundemer at 408-866-5436 for more information ($30/member; $35/non-member)

Upcoming Field Trips of Interest – Association of Engineering Geologists

March 27, 2004

Seismic Hazard of the Range Front Thrust Faults, Northeastern Santa Cruz Mountains / Southwestern Santa Clara Valley

Confirmed field trip co-leaders:

Bob McLaughlin, John Wakabayashi, Christopher Hitchcock, Jim Hengesh, Ted Sayre, Reid Fisher, Steve Connelly, Ron Rubin, Glenn Borchardt, Drew Kennedy

Additional details are forth coming.

Upcoming Meetings of Interest – Bay Area Geophysical Society

February 26, 2003 BAGS Luncheon:

William E. Black, NORCAL Geophysical Consultants, Inc.

The Application of Geophysical Techniques to Engineering, Geotechnical and Groundwater Investigations

An abstract and biography can be found at **http://sepwww.stanford.edu/bags/Talks**

Social and Lunch: 11:30 a.m. in the ChevronTexaco cafeteria.

Talk: 12:30 p.m. in Room D-2153, ChevronTexaco Park, 6001 Bollinger Canyon Rd., San Ramon, CA.
There is no charge for this program. You may buy your own lunch in the ChevronTexaco cafeteria.

Note: Non-ChevronTexaco employees RSVP by email to warren.king@chevrontexaco.com or by phone to **Warren King** at 925-842-9964 by 12:00 noon, Monday, February 25th. This must be done to arrange visitors' passes.

Please check the BAGS website:
http://sepwww.stanford.edu/bags/
regularly for meeting notices and updates.

Member Note

We have received sad word that NCGS member **Dick Chambers** has died very recently. He was a former employee of Chevron. Additional details are forth coming.

A Short Trip Through the Firmament

The NCGS opened 2004 with a Family Night presentation from St. Mary's College Astronomy Professor **Ron Olowin**. An active member of the astronomy community, Ron presented NCGS members with ***The Earth: Having a Sense of Place in the Cosmos*** at the January 28th society meeting. This lecture, replete with images taken by the orbiting Hubble telescope, provided Ron with a fitting backdrop for his commentary on mankind, the earth, and our place in the vast expanse of space-time. The focal point of his talk was how time, location (or spatial drift), and chance have interacted to form the universe as we know it.

Since prehistoric times, man has watched the Heavens with awe, and has been inspired by its breathe-taking beauty. The celestial bodies have been the source of folklore and pagan rituals, recounted in allegory and primitive art for centuries. Yet the scientific exploration of the nighttime skies is a relatively recent human endeavor. Ancient civilizations of Egypt, Mesopotamia, Greece, Persia, and the Orient had a fundamental grasp of celestial mechanics, and were able to navigate and construct accurate calendars based on annual movements of the stars. Scientific study of the stars and planets, however, was prohibited during medieval times, but was cautiously resumed after explorers like Christopher Columbus dared to challenge conventional views and ultimately circumnavigated the globe.

The stars have guided us and enchanted us with their beauty. And in the grand scheme of things they are a window to creation itself. The earth and her existence are linked to a singular coincidence of time, spatial location, and chance. The basic understanding of our planet and its evolution over time began with the pioneering work of 15th and 16th century scientists like Nicholas Steno, who recognized fossils as a key interpretive element of rocks. Steno went on to establish the basic principles of stratigraphy: the superposition of strata (each layer of sediment is laid on top of an older unit), the principle of original horizontality, and the concept of strata continuity. The element of time was introduced by James Hutton, whose estimate of the earth's age conflicted harshly with the Biblical chronology championed by Bishop Ussher. Hutton, a renowned Scottish geologist equally well known for his cumbersome writing style, summarized his observations on the history of the earth with the simple statement "…(in geology) we find no vestige of a beginning – no prospect of an end." Serious detriment to the age of the earth was dealt by the leading physicist of Victorian times, Lord Kelvin (William Thomson), who used heat flow calculations to determine a maximum age for the earth of 100 million years. His results conflicted with estimates made by both geologists and Darwinian evolutionists, but Kelvin's stature in scientific circles at this time prevailed. It wasn't until natural radioactivity and its contribution to terrestrial heat flow was recognized that Lord Kelvin's estimate was justly revised. Based on his calculations, Lord Kelvin had also surmised that the sun would last no more than a few hundred million years. Entering the Twentieth Century, geological thought turned to the origin of continents and ocean basins. German geologist Alfred Wegener proposed the theory of continental drift in the early 1900's, but his hypothesis, founded on compositional and paleontological evidence gleaned from opposite sides of the Atlantic Ocean, met with opposition from the more conservative "pemanentist" school of thought by James Dana and, later, by Bailey Willis. Their philosophy persisted until evidence revealed by studies conducted during the International Geophysical Year in the late 1950's revived continental drift theory. The ensuing plate tectonics revolution received impetus from Canadian geophysicist J. Tuzo Wilson and others during the 1960's. Its momentum has persisted through current times, and at present it is the leading theory for the dynamic behavior of the earth's crust.

Having explored the behavior of our own planet, Ron stepped back and rhetorically asked the audience how one could model the earth's origin in space and time. His response was twofold: the birth of the sun and the formation of the solar system. A primordial dust cloud underwent a slow gravitational collapse, its angular momentum caused the cloud to rotate and assume a disk shape, and eventually discreet planetoids formed from the residue that did not condense to form the sun at its center. Ron noted that the segregation and gravitational collapse of the dust cloud also involved chemical differentiation, with the denser silicate-based planets orbiting closer to the sun, and the gaseous giants forming farther out. A closer examination of the inner four planets (Mercury, Venus, Earth, and Mars) reveals numerous cratering

events that tell their own story about the solar system. These chance encounters with various sized celestial bodies, thought to be debris from a dense planetary object destroyed in a catastrophic collision, have conceivably played an important role in the evolution of terrestrial life forms. The fossil record records five major biological extinctions in earth history, and there is a growing body of evidence suggesting a causal link to major meteorite impacts. The 65 million-year-old Chixalub impact crater on the Yucatan peninsula in southeastern Mexico is being carefully studied as the potential triggering event for the Cretaceous-Tertiary dinosaur extinctions. Scientists who have studied the brain-to-body mass ratio in the fossil record have conjectured that had this late Mesozoic extinction not interrupted dinosaur evolution, intelligent reptilian beings might be occupying the niche now filled by man! A massive planetoid collision with the earth early in its history has been conjectured as having formed the moon. The pair is unique in that the earth's iron core is quite large for a silicate-based planet, whereas the moon has no iron core. The original planetary body must have been a combination of the two.

Location in the solar system has strongly influenced the origin of life on earth. The chemical evolution of the planet, including its distance from the sun and heat flow considerations, has made it amenable to life as we know it. Plate tectonic activity has been considered a necessity for life, based on recent discoveries of extremophiles (primitive one-celled organisms) in hydrothermal vents in deep sea spreading ridges. Aerobic and photosynthetic biological activity began when the oxygen level in the atmosphere increased in the Precambrian. Still scientists argue whether organic life actually originated on this planet or was introduced by meteorites. Interestingly, now that man has explored the moon and has recently sent probes to the Martian surface, NASA has taken precautions to ensure that terrestrial life forms do not contaminate the Red Planet. These precautionary steps seem fitting, considering that a camera lens brought back from the lunar surface had a fungal colony flourishing in its Canadian balsam seals.

The sun provides man with heat and light, and the electromagnetic "solar winds." Spectral analyses and direct observation of its surface phenomena give us insight into the chemical processes that occur in stars. The nocturnal skies allow astronomers equipped with telescopes to probe the Heavens and categorize stellar bodies by their spectral properties. A graphical plot of spectral color (x-axis) versus brightness or luminosity (y-axis) for visible stars yields a discreet abundance distribution from the blue (near the origin) to the red spectrum. There are very few dim blue stars, but as one approaches the red end, there is a fairly uniform abundance distribution from bright to dim luminosity. These spectra reflect compositional features defined by various chemical reactions occurring in the stellar bodies. The latter characterize specific points in the evolution of the star from its birth to its demise.

A cursory look around the skies indicates a uniform distribution of matter throughout the universe. The largest assembly of stars in the universe is a galaxy. Gas clouds, or nebulae, in our own galaxy, the Milky Way, are considered to be the birthplace of new stars. The gravitational collapse of the gas cloud allows "EGGS" or evaporating gaseous globules, to form from the stellar dust. Further consolidation forms a central star and a system of planetary bodies orbiting it – a solar system. Astronomers have spotted over 300 of these planetary systems. Not all dust clouds form solar systems. Others conceive groups of stars, known as globular clusters. The most famous of these are the Pleiades, a 70 million-year-old globular cluster visible to the naked eye. The typical lifetime of a star is about 10 billion years. Towards the end of its life, as the star runs out of hydrogen, its nuclear reactions change. It begins to swell up and lose mass, then cools and turns red. This reaction will occur to our own sun in about 5 billion years, as it approaches its life expectancy. Ultimately, the dying star explodes and collapses in a process known as a supernova. This phenomenon has been observed in human times. The most spectacular supernova was in 1054, when light from an ancient event reached the earth and produced a star that was visible even in broad daylight for 23 days. The dust cloud left from this supernova is known as the Crab Nebula. The dust ejected from supernovas is rich in trans-iron elements. In expanding stars, the helium produced from the prior hydrogen fusion reaction now reacts to form carbon, nitrogen, and oxygen. The subsequent more massive stars burn these elements to form the elements from magnesium and silicon through iron. This matter gets disseminated throughout the universe. Hence, from original elements rich in hydrogen, helium, and traces of carbon, nitrogen, and oxygen, stellar

nucleosynthesis for heavier elements that later coalesce into planetary objects. It should be noted that these heavier elements are relatively rare, and limit the potential for forming terrestrial-type bodies in the universe.

As the largest discreet assemblages of stars, the galaxy is a subject of great interest to astronomers. They form spirals, barbed spirals, and spherical masses of stars several hundred thousand light years across. Our solar system is two-thirds the distance from the center to the edge of the Milky Way; the constellation Sagittarius is in its center. It is a spiral galaxy whose nucleus follows Kepler's Laws of Motion, but whose outer spiral arms do not. Galaxies have a non-random distribution pattern throughout the universe. In spite of the tremendous distances between these enormous stellar objects, collisions do occur. The Milky Way will, in fact, collide with its nearest neighbor, the Andromeda galaxy, in 3 billion years. Astronomers have detected one trillion galaxies, and these objects are part of an expanding universe that, to our best knowledge, originated in a singular event (the "Big Bang") 13.7 ± 2 billion years ago. The expansion of our universe involves complex concepts intangible to the average person. Some of these theoretical arguments are associated with energy concepts that have no analogy in our space-time perspective. However, these concepts, such as "dark energy" and "cold dark matter" are causing the universe to expand and are binding galaxies together. They are theoretical conceptual phenomenon that cannot be detected by our instrumentation. Based on theoretical calculations, the ever-accelerating expansion of the universe will cause all matter to rip apart in 30 billion years.

Nothing is more introspective than a jaunt through the cosmos. To peer at its spectacular scenery, recorded by powerful telescopes that capture images of landscapes painted thousands of light years ago. Ron Olowin's spectacular presentation was beautifully illustrated with images from the Hubble space telescope. The NCGS sincerely thanks him for opening its 2004 season with a thought-provoking presentation of man's place in the universe. A glimpse at the past and speculations about the distant future.

Lindblom Receives PSAAPG President's Award

At the January 28th NCGS meeting, Past Pacific Section AAPG President Tom Hopps presented long time NCGS and PSAAPG member **Robert G. Lindblom** with the first PSAAPG President's Award. Hopps cited Bob's meritorious service to the Pacific Section AAPG, AAPG International, and the petroleum industry as qualifying him for this distinguished award. Bob is an Ex-Officio member of the Petroleum Investments Committee and Consultant to the Stanford Management Company, Department of Petroleum Engineering, Stanford University; and former President of the California State Board of Registration for Geologists and Geophysicists. Congratulations, Bob!

NCGS Awards Undergraduate Scholarship to CSU Chico Student

California State University at Chico senior **Ryan Alward** received the NCGS Undergraduate Scholarship Award at the January 28th meeting for his senior thesis topic ***Facies Analysis of the Tuscan Formation, Northern Sacramento Valley, California.*** His proposed study will provide a sedimetologic description of aquifer fluid flow in volcanic breccias, sands, and ash flow layers by sequence stratigraphic correlation of electric-log well data, field mapping, measured sections, and well cores. The project will utilize principles of lithostratigraphy, sedimentology, and groundwater hydrogeology. Ryan's advisor is **Dr. Morgan Sullivan**, who attended the award presentation. Ryan received a $500 check from NCGS Scholarship Chair Randy Kirby.

FRIENDS OF THE PLEISTOCENE, 2004 PACIFIC CELL FIELD TRIP MEETING: SANTA BARBARA FOLD BELT, SANTA BARBARA, CALIFORNIA

You are invited to attend the Friends of the Pleistocene field trip for 2004 in Santa Barbara, CA area, April 15-18, 2004.

WHAT WE WILL DO ON THE TRIP

The field trip will officially start the morning of Friday, April 16, 2004 at 8am .We will meet at the eastern end of Shoreline Park in the city of Santa Barbara to begin our exploration of the Santa Barbara Fold Belt. There will be a number of presentations at Shoreline Park to examine the marine terrace history of the fold belt. We will also take a short walk to look at some of the uplifted marine terraces we believe may have been produced by late Quaternary earthquakes. At about noon, we will drive to East Beach where we will begin a hike along the coast to examine three active anticlines: the zoo-cemetery; Ortega Hill; and Loon Point. At Loon Point we will also be able to observe a fault-propagation fold that deforms a 105 ka terrace. We will then walk back to the cars or provide support for drivers of cars to return and pick-up the rest of the people before heading up to Lake Cachuma Campground for Friday night. There will be evening video presentations at the campground by Tanya Atwater on the plate tectonic history of southern California.

On Saturday, April 17 we will meet at 8:00am at a coastal site to be decided by Doug Burbank and Alison Duvall to discuss rates of stream incision in the Santa Ynez Mountain Range. Tim Tierney will also talk about the evolution and segmentation of the Santa Ynez Range. At about lunchtime we will meet next to the Santa Barbara Historic Mission where we will observe the tectonic geomorphology of the active Mission Ridge anticline including several paleochannels of Mission Creek and to discuss the westward propagation of the fold. We will then walk to Rocky Nook Park to view a giant debris flow with a volume of about 10 million cubic meters. Presentations will be made by Amy Selting and Robert Urban on the debris flow features and hazards. Following lunch, we will drive to Skofield Park where we will look at the landslide and headscarp that we believe is the origin of the debris flow. Also, Lee Harrison will talk about pool formation in Rattlesnake Creek at Skofield Park. We will then hike up Rattlesnake Canyon to an overview site, where if the weather is clear, we should be able to see Point Conception to the west and the Santa Monica Mountains to the east. We will then hike back down to the cars and return to our campground at Lake Cachuma. (You might want to bring a fishing rod as there is good trout fishing this time of year in Cachuma).

On Sunday, April 17th, we will leave the campground at approximately 8:00am and head up to the University of California reserve system site known as Sedgwick Ranch. At that site we will examine hill slope and other processes with Tom Dunne, Manny Gabet, Oliver Chadwick and Tony Garcia. The field trip will adjourn late in the afternoon with all the participants heading to their perspective homes.

OPTIONAL DAY: Thursday, April 15, 2004 at 12:30-4:30 pm. Robert West will lead a field trip that will focus on the emergent coastline between the mouths of the Devereaux and Goleta sloughs, Goleta, California. Topics covered in the field trip will include: 1) coastal erosion processes; 2) rates and styles of sea-cliff retreat; 3) long-term fluctuations in beach storage; 4) politics of shoreline stabilization strategies; and 5) evolution of an emerging marine terrace. An important aspect of this "Beach Walk" will be the generation of discussion about the implications of historically documented change on: 1) long-term evolution of the UCSB marine terrace and sea-cliff configuration; and 2) future shoreline stabilization strategies. Details on itinerary and participants will appear in a future posting on the FOP website. For further information on the optional day field trip contact Robert West at westrb@elac.edu or call (323) 260-8115.

COST OF THE TRIP

We are working on the cost for the trip and people registering will become aware of that cost in due course. Camping is about $ 5, per person per night, and we plan a catered Santa Maria style BBQ of chicken or tri-tip for Saturday evening that will probably costs between $10-$15.

CAMPING

For those arriving on Thursday, we will have camping facilities available at Cachuma Lake Campground, located approximately 20 miles north of the city of Santa Barbara. There are no limits on the number of people who may attend the meeting, but we have reserved 3 campgrounds with a maximum capacity of about 200 people. We will include the camping fees in the costs of the trip and will send camping passes for the group sites to those that pay in advance. If we go over 200 campers and you are late to register, then you will have to make your own camping reservations at Lake Cachuma. They do have a number of campgrounds other than the group campgrounds we have reserved.

We will post the guidebook in pdf format on our website and it will be available for download mid-March. There is a store at Lake Cachuma and so we are encouraging everyone to bring or buy their own beverages.

We look forward to seeing you at the FOP trip at Santa Barbara on April 15-18, 2004. The field trip website is presently under construction but we expect it to be up in a few days. The website address for field trip information and downloading the registration form for the meeting is: http://www.geol.ucsb.edu/projects/fop2004.

Revised USGS Publication Series

The US Geological Survey has made signification changes in its publication series. The increased emphasis on an interdisciplinary approach to research has led the USGS to revise its scientific publication series. The series resulting from this change are designed to accommodate a broad range of research topics in biology, geology, geography, and hydrology.

The resulting series are Circular, Data Series, Fact Sheet, General Information Product, Professional Paper, Open-File Report, Scientific Investigations Map, Scientific Investigations Report, and Techniques and Methods.

The following titles will be discontinued and absorbed into the revised series: Biological Science Report; Bulletin; Digital Data Series; Geologic Investigations Series (I-maps); Hydrologic Investigations Atlas (HA-maps); Information and Technology Report; Miscellaneous Field Studies Map (MF-maps); Techniques of Water Resources Investigations (TWRI); Topographic Instructions; and Water Resources Investigations (WRI). The list below outlines the scope of the revised series and their relationship with the discontinued titles.

- Circular

Scope: General science and public policy topics related to the mission of the USGS
Numbering: No change (example: Circular 2345).

- Data Series

Scope: Release of basic data sets, databases, computer programs, etc. Incorporates: Digital Data Series, Information and Technology Report. Numbering: Continues the numbering of Digital Data Series without the DDS prefix (example: Data Series 55).

- Fact Sheet

Scope: Brief descriptions of USGS science and products. Numbering: Uses year-number; numbers start with 3001+ (example: Fact Sheet 2004-3001).

- General Information Product

Scope: Topics of general interest in a variety of formats (pamphlets, postcards, posters, bookmarks, teacher kits, etc.). Numbering: Sequential (example: General Information Product 1).

- Professional Paper

Scope: Premier series of the USGS containing comprehensive scientific reports
Incorporates: Biological Science Report. Numbering: No change (example: Professional Paper 3456).

- Open-File Report

Scope: Interpretive information that must be released immediately, preliminary information, or information that does not warrant release in one of the other USGS series. Numbering: Uses year-number; numbers start with 1001+ (example: Open-File Report 2004-1001).

- Scientific Investigations Map

Scope: Scientific results of studies presented as maps, charts, stratigraphic sections, or other large illustrations. Incorporates: Geologic Investigations Series (I-maps), Hydrologic Investigations Atlases (HA-maps), Miscellaneous Field Studies Maps (MF-maps), Water Resources Investigations Report (WRI) maps. Numbering: Continues the numbering of I-maps, without the I-prefix (example: Scientific Investigations Map 2456.

- Scientific Investigations Report

Scope: Significant data and interpretations of lasting scientific interest but generally narrower in scope than Professional Papers.
Incorporates: Biological Science Report, Bulletin, Information and Technology Report, Water Resources Investigations Report (WRI). Numbering: Uses year-number; numbers start with 5001+ (example: Scientific Investigations Report 2004-5001).

- Techniques and Methods

Scope: Descriptions of procedures for collection, analysis, or interpretation of scientific data. Incorporates: Information and Technology Report, Techniques of Water Resources Investigations (TWRI), Topographic Instructions. Numbering: Continues the numbering of Techniques of
Water Resources Investigations (TWRI) (example: Techniques and Methods Book 8, Chapter A, Part 3).

A Fact Sheet will be published soon on the revisions. Send questions about the changes to Nancy Blair, Chief Librarian, nblair@usgs.gov; (703) 648-4305.