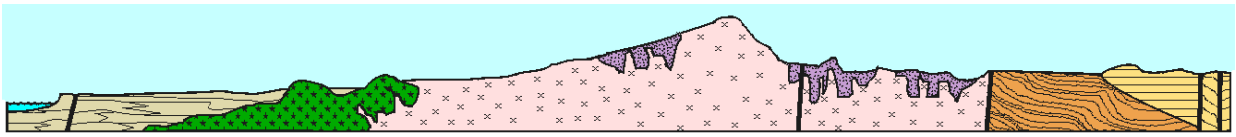

SAN DIEGO ASSOCIATION OF GEOLOGISTS

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SDAG MEETING ANNOUNCEMENT

THURSDAY, OCTOBER 8th, 2009 *(note the day change)*

THE REALLY BIG PICTURE OF THE GEOLOGIC HISTORY OF SOUTHERN CALIFORNIA FROM 15 Ga TO THE CRETACEOUS!

A Field Trip Primer

Presented by

MONTE MARSHALL, PROFESSOR EMERITUS, SDSU

Where: Catalina Room (southern end of MVCC) **SEE MAP**
Marina Village Conference Center
1936 Quivira Way, San Diego, CA 92109

When: 5:30 pm – Social Hour
6:30 pm – Dinner
7:15 pm – Program

Directions: FROM INTERSTATE 5: Take the SEA WORLD DRIVE exit. From SEA WORLD DRIVE, take WEST MISSION BAY DRIVE on your right. When you see the large green sign that says QUIVIRA ROAD, get in the farthest left of the two left turn lanes. Turn left, go one very short block and turn left again. Drive about one half mile and MARINA VILLAGE will be on your right.

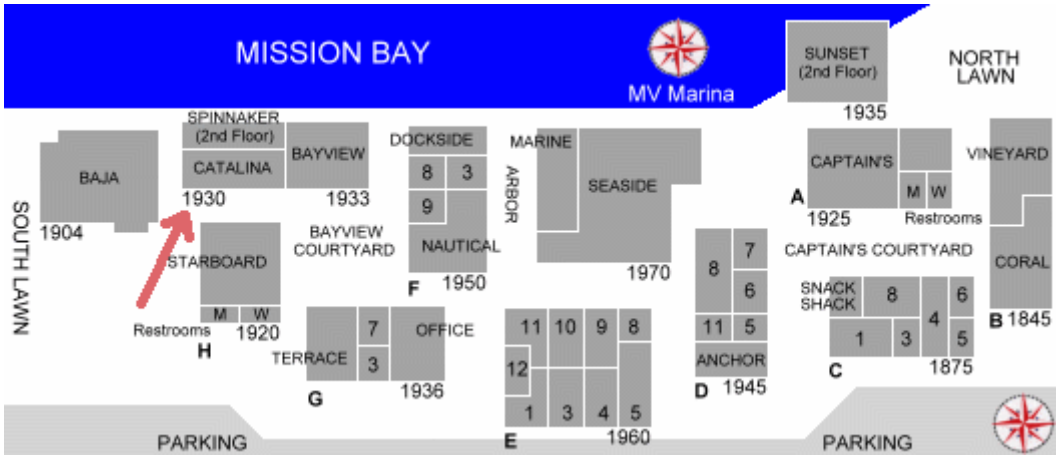
FROM INTERSTATE 8:Take the WEST MISSION BAY DRIVE exit to the right. You will be on INGRAHAM STREET for a short distance from which you will take the next exit marked WEST MISSION BAY DRIVE on your right. When you see the large green sign that says QUIVIRA ROAD, get in the farthest left of the two left turn lanes. Turn left, go one very short block and turn left again. Drive about one half mile and MARINA VILLAGE will be on your right.

Dinner: Hawaiian Luau. Cash Bar.

Cost: $30 per person, $5 discount for members, STUDENTS: $20. Add $5 if you did not make a reservation

Reservations: Make your reservation **online** at www.sandiegogeologists.org **no later than noon, *Tuesday*, October 6th.**

RESERVATIONS CANNOT BE ACCEPTED AFTER MONDAY AT 12 NOON.
IF YOU DO NOT MAKE A RESERVATION, WE CANNOT GUARANTEE YOU A MEAL.



2009 SDAG MEETING SCHEDULE – Mark your Calendars!

Meetings are usually on the 3rd Wednesday of the month but may change to accommodate speaker and meeting place schedules. Check here for updates!

2009 EXECUTIVE COMMITTEE

PRESIDENT – Scott Snyder; *Ninyo & Moore*; Ph: (858) 576-1000; sdag2006@prodigy.net
VICE PRESIDENT – **Bryan Miller-Hicks**; *Cuyamaca College*; Ph: (619) 733-3724 geobry@aol.com ; bryanmillerhicks@gmail.com
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MONTE MARSHALL, PROFESSOR EMERITUS, SDSU

Many of you know by now that Monte is a native San Diegan, one of the few (and the proud) Mercy Babies! Fewer know however that his role model at St. Augustines' HS was his priest/physics teacher, which led him to join the Augustinian Order with the goal of becoming a priest/physicist. While doing his undergraduate studies at Villanova U., he fell in love with astronomy and changed from physics to astrophysics. When he left the seminary in 1963 and returned to San Diego, he enrolled in physics and astronomy at SDSU. But, as luck would have it, he met another charismatic teacher, Baylor Brooks, and took Baylor's beginning geology class! So geology and geophysics quickly replaced astronomy and astrophysics! After getting his PhD at Stanford in 1971, Monte did research at the USGS in Menlo Park for four years, and then returned to SDSU. For almost 30 years he taught courses in geophysics, Structural and Petroleum Geology, Field Geology, and grad classes in Paleomagnetism and Plate Tectonics and Geotectonics. His main research areas were gravity-based studies of the faults in the SD Metropolitan Area and the major faults to the east, and the paleomagnetism of southern and Baja California. Monte has given many talks over the years to the SDAG and other groups, usually on the geology of special places on the earth like the Alps, the Andes, or coral atolls. His efforts to put together an overview of the history of the geologic events leading up to the intrusion and mylonitization of the northeastern Peninsular Ranges batholith, as an introductory article for the book that will be published in association with our annual field trip in November, led him back to the beginning of the North American continent. Thinking about the composition and evolution of the early earth then brought him back to his early love, astronomy and astrophysics—hence the title!

"THE REALLY BIG PICTURE OF THE GEOLOGIC HISTORY OF SOUTHERN CALIFORNIA FROM 15 Ga TO THE CRETACEOUS! A Field Trip Primer"

Astronomy, like geology, has undergone an intellectual revolution or knowledge explosion in the last 40 years. Geochemists can now talk to cosmochemists and get a reasonably good answer to the question: how did our earth come to have the kinds and percentages of elements that we think it does?

Things happened very fast in the early seconds of our universe! After a few pico seconds of unbelievably intense radiation confined to a sphere a few meters in diameter, the universe expanded to a ball some tens of Km across that also contained massive elementary particles, like protons, and then electrons. By the time the universe celebrated its first birthday it was one light year big (10^16 m), and the charged particles began to combine to form nuclei of very light elements—about 75 % hydrogen and 25 % helium. After thousands of years, the nuclei began to capture electrons and form atoms and then molecules. At that point, the very important force of gravity began to attract the atoms and molecules, and matter began to congregate into separate clouds, or nebulae, then clusters of nebulae, then clusters of clusters. As the smaller clouds of primordial gas condensed, the temperature increased until the hydrogen atoms began to fuse into helium, as in hydrogen bombs, and stars were born! Stars came together to form galaxies and by a few billion years the universe started to look like it does now.

But the real contribution that modern astrophysics makes to geology is what has been learned about nucleosynthesis, the formation of nuclei of all the known elements. Our sun gets the energy to shine by fusing hydrogen to helium. What is not so well known, is that the fusion of other lighter elements, up to iron, also produces energy. Fusing the heavier elements requires energy. That's why splitting uranium or plutonium into lighter weight atoms releases energy in the atomic bomb. Stars with a mass of our sun can fuse helium into carbon and oxygen. But stars with a mass 20 to 30 times that of our sun can produce elements up to iron. To form the rest of the elements requires the tremendous energy in either the core of a red giant or in a supernova explosion.

Now to the formation of our solar system. Again, modern astronomy has a lot to teach us. Our sun is a second generation star, and is only about 5 billion years old. Currently, the most popular model for the generation of solar systems like ours is the nebular hypothesis. Nebulae were mentioned earlier in the formation of the first stars. But at 5 Ga the interstellar nebulae contained dust as well as gas and their composition had been considerably enriched by the nucleosynthesis just mentioned. Astronomers now think that interstellar "dust" is micron-sized balls that possibly have silicate, graphite, and iron cores, that are surrounded by ices of water, carbon dioxide, ammonia, and methane that are coated with organic tars!

And, if the nebula is spinning it will not only contract because of gravity, but will flatten to a disk with a bulge in its center. The hydrogen gas in the central bulge condensed, heated, began to fuse into helium, and our sun was born. If the gas and dust in the outer parts of the disc was unevenly distributed, gravitational attraction would cause the matter to condense into ever larger clusters. As these clusters, called planetesimals, grew larger their gravitational attraction grew larger and they they 'swept clean' large paths as they orbited the sun—making our planets. Some of the original matter between the planets still orbits the sun and we see most of it as comets, asteroids, and meteoroids. Comets are thought to consist mostly of the ices mentioned above with a silicate coating. Asteroids and meteoroids are either mostly iron or stony (silicates, some with several percent carbon). Astronomers consider these objects to be 'primitive' and thus likely to represent the bulk composition of our solar system. During the final stages of the condensation of the planets, the high temperatures near the newly ignited sun/the solar wind pushed the lighter gases away from the inner four, or terrestrial, planets. The outer four, or Jovian, planets retained much more of their light elements/gases and have a more 'primitive' bulk composition.

At last we come to the evolution of the Earth! As mentioned above the age of our solar system is estimated at about 4.5 Ga, i.e., is 4.5 billion years old. During its first few million years, tremendous heat was generated by all

the chunks of matter crashing into it with velocities as high as 20 Km/sec. The largest of these is currently thought to be a body the size of Mars that possibly struck the earth a glancing blow at 4.5 Ga, melting both itself and the earth, and throwing molten material into space around the earth—that condensed to form our moon. So most geologists believe that the early earth was entirely molten and that its surface was a magma ocean. With the help of the cosmochemical data, geochemists estimate that about 90 % of the earth's mass consists of only 4 elements: iron, oxygen, silicon, and magnesium. Given its high density, much of the iron, along with some nickel, oxygen, and sulfur, quickly settled to the interior to form the earth's core. The rest of the iron and magnesium combined with silicon and oxygen to make the much lower density silicate mantle. Perhaps only 100 My after the moon-forming collision and melt-down, the few percent of the rock-forming elements not mentioned above, i.e., calcium, sodium, potassium, and aluminum, formed even lower density felsic/silica-rich melts that made their way to the surface to form the first continental crust.

The North American continent is the oldest and most symmetrical continent on earth. The Canadian Shield and Interior platform compose its center and they are flanked on the east by the Appalachian Mtns. and on the west by the Cordilleran Mountain belt. The Canadian Shield is the largest shield in the world and is the oldest part of our continent and consists of 7 Archean (4 to 2.5 Ga) greenstone-granite-gneiss provinces. Each province is a late Archean aggregate of early and/or middle Archean crust, thought to have been similar to present day island arcs. The 7 provinces were sutured together during early Proterozoic (about 2.4 Ga) orogenic events. The Interior platform forms most of the north central United States and consists of mostly flat-lying Paleozoic sedimentary rocks overlying/covering some of the same pre-Cambrian basement rocks that are exposed in the Canadian shield. The shield and platform form the stable craton that the late pre-Cambrian and younger crustal blocks were welded onto.

The next major addition to the North American continent happened at about 1.7 Ga when a series of island arcs, possibly similar to present day SE Asia, were welded to the southwest US. This 1.8 to 1.6 Ga crust extends from the Archean Wyoming province to Sonora, Mexico and from the San Andreas fault to the Front Ranges of Colorado, and possibly even further to the northeast. Called the Yavapai and Mazatzal provinces, this early Proterozoic crust is apparently what the Eastern Peninsular Ranges plutons were intruded into. The final major addition to our craton is a long belt of igneous and metamorphic rocks that was thrust onto the craton during the Grenville orogeny at about 1 Ga, and extends from Labrador, inboard of the Appalachians and Ouachitas, all the way to Sonora.

These Grenville rocks were probably sutured to North America during the formation of a supercontinent, called Rodinia, that preceded Pangea by 700 My. Geologists believe that two other continents lay off the current west coast of North America during the lifetime of Rodinia, the most likely candidates being Australia or East Antarctica. When Rodinia began to break up, these continents rifted away from western North America at about 700 Ma forming the present Pacific ocean. The western crust cooled and subsided allowing late pre-Cambrian sedimentary rocks to be deposited. Paleomagnetic data show that the west coast at about this time was really the north coast of our continent and was located at the equator! The coast remained a passive margin for several hundred million years until subduction began sometime in the Paleozoic. A long history of Pacific seafloor subduction has accreted assorted allochthonous terranes to western North America in the form of island arcs, ancient seafloor crust and sediments, and continental fragments. Forceful suturing of island arcs and shallow subduction caused much of the deformation in the Cordillera. Juro-Cretaceous subduction produced much of the Andean-type, continental arc magmatism extending from the Sierras down thru the Cretaceous plutons of the Eastern Peninsular Ranges into Baja California. As I discussed in a paper in the 2005-2006 SDAG Fieldtrip guidebook, the western Peninsular Ranges are apparently one of the many island arcs that were accreted to the western margin during subduction.

President's Corner, October 2009

It's that time of year again folks! No, not Halloween, and not Thanksgiving, not even Christmas, Hanukkah, or Festivus! Even better…it's time for the umpteenth annual SDAG FIELD TRIP! This year, Bryan Miller-Hicks and Dr. Monte (Montek the Gracious, Terrible, Ostentatious, Verbose, and Wonderful…for those who know him) Marshall will lead us on another exciting trip through Southern California geology. This year is a special year, since we will have an unprecedented, and likely not repeated, opportunity to venture into Deep Canyon in the Coachella Valley. Deep Canyon is a place that is off limits to the general public, even to most scientists. It is as undisturbed an area as you will find in this heavily populated region of our country. We will be learning much more about the evolution of the Peninsular Ranges than we ever have before, and you will not be disappointed. In fact, if you were at the last SDAG meeting, Dr. Marshall issued a money-back guarantee that you will be totally satisfied with this trip. I don't believe that has ever been offered before, so what do you have to lose? Brad Erskine, Monte's fave student, and knowledgeable about all things geologic in this area, will also be a key leader for the trip. So come on out and join us, we're going to have another great time!

Thanks to George Morgan for a couple of great talks with lots of pretty pictures. The work he and brother JR have been doing in AZ and the Coyote Mountains is truly inspirational. It makes us all envious to be able to work on the real geology they have been working on. Nicely done George, and we look forward to updates as your work progresses.

This month's meeting will not only cover some of the background for the upcoming field trip (though you will still find it entertaining and informative, even if you don't (gasp) come on the field trip), but we will also be getting a presentation from Kim Taylor (attorney, geologist, and SDAG member) who has been instrumental in working toward bringing the elimination of the BGG to a more palatable conclusion than what is intended. You have been receiving emails from Phil (and others) about what is going on and what you can do, so please take action, but Kim will give us an update into the legal issues and procedures being planned and implemented to save the BGG or at least get us representation on the Engineers Board. This is a quickly and constantly evolving situation, so please try and join us to get the low down on what is going on.

So we have a lot going on right now, stay informed and get involved. Our annual Holiday Party will be coming up in December, so keep your eyes and ears peeled for more info on that. Finally, we are looking for one or two volunteers to join the SDAG Board. As my term is soon expired, we need to replace me (if that's possible) and even the venerable Phil Farquharson, how stepped in as Interim Secretary this year. It is a great opportunity to give back and meet lots of great people. There is a ton of support, so you won't be left without guidance. It has been a truly rewarding experience, so please consider it for yourself. I'm glad I did. Thanks Margaret.

Scott

2009 CORPORATE SPONSORS - THANK YOU!!

Corporate sponsors provide a significant portion of SDAG's operating and scholarship budget. In addition to monthly recognition for your contribution, you are entitled to a free Internet link from SDAG's Website. We also list Corporate Sponsors in our annual SDAG Field Trip Volume.

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ANNOUNCEMENTS

SDGS/SDAG

As many of you are aware, the San Diego Geological Society (SDGS) was formed early this year as an official non-profit 501(c)3 corporation, and SDAG is now an organization under this corporation. The reasons for doing this were many and they are spelled out in an informational sheet, the Business Plan of SDGS. The officers of SDGS should be very familiar to you, as they are all past presidents of SDAG, as well as me, Scott Snyder, current SDAG President. For those of you that would like to read more about SDGS and what it means to SDAG, check out the informational page on the website. Also check out the website www.sandiegogeologicalsociety.org (Not to be confused with the San Diego Genealogical Society of course…)

CALL FOR PAPERS:

"Mylonitization and associated low angle/detachment faulting in the northern Santa Rosa and southern San Jacinto Mountains, California."

To be published in association with the

2009 San Diego Association of Geologists Annual Field Trip

November 7th and 8th, 2009

Co-organizers:

Bryan Miller-Hicks, Vice President, SDAG
Independent engineering geology consultant
bryanmillerhicks@gmail.com 619-733-3724

Dr. Monte Marshall, Ph.D.
Emeritus Professor of Geologic Sciences, SDSU
mmarshall@geology.sdsu.edu 619-795-9871

SCOPE: Papers addressing topics related to mylonites, geology, structural geology, metamorphism, metasediments, faulting, folding, meta-structures, biology, environmental issues, geography, native American culture, and history of the Deep Canyon, northern Santa Rosa Mountains and southern San Jacinto Mountains

TIMELINE: Email a statement of interest & topic to the co-editors as soon as possible

Manuscripts due: April 15th, 2009
Revised manuscripts due: July 1st, 2009
Target publication date: late September, 2009

For further information, contact bryanmillerhicks@gmail.com or mmarshall@geology.sdsu.edu

- Contact Terry Cochran at 619-258-4905, ext. 110 or tcochran@sunbeltpub.com for more information.

SEEKING JOB OPPORTUNITIES!

Daniel Meeh: I am interested in obtaining an entry level position in a Geology related field. I have received my Bachelors of Science degree in Geology from Wheaton College and I am looking forward to putting my knowledge to practical use. I am also a dedicated, driven individual who desires excellence in everything that I do. Not only am I well educated, but I am willing to learn a job and give above and beyond what is expected. I am confident that I can be a great asset to any organization. I appreciate any help you can offer and I would very much like to discuss my qualifications with you in person. I can be reached at 281-701-0826 or by e-mail at Daniel.Meeh@my.wheaton.edu.

Jake Lippman: I am looking for an entry-level position as a geologist. In particular, I am interested in hazard assessment (seismic, landslide, flooding, etc.) I am a recent graduate with a BS in Geology from UC Davis and an MA in Climate from Columbia. Please e-mail me with any employment opportunities at jdl2129@columbia.edu or call (415) 672-0918. Thank you very much!

Patrick Rentz:: I am currently a graduate student at Scripps Institute of Oceanography, obtaining my M.S. in Earth Science. My defense and graduation is planned for the near future (September 2009 if things go according to plan). I am interested in employment opportunities in the San Diego through Riverside areas. For contact information, resume, and details on my research, please feel free to visit my website www.patrentz.com. I look forward to hearing from you!

Jared Warner:: He was our student scholarship winner last year, who made his fine presentation at our March meeting. He wrote me (PTF) in a recent E-mail: "I just recently finished up my internship with Occidental Petroleum up in Bakersfield and found it rather enjoyable. Now it's off to races with applying to jobs!" He can be contacted at jared.j.warner@gmail.com or (661) 972-5332.

JOB OPENINGS!

Brian F. Smith and Associates (BFSA) has immediate openings for several qualified individuals including **Paleontological Monitors**, and **Project Paleontologists** for projects in San Diego, Riverside, and San Bernardino Counties. Positions require a B.A. or M.A. in geology, paleontology, or a related field, and field experience in southern California. Current City of San Diego Paleontological certification preferred, or must be able to become certified immediately. Compensation will depend upon qualifications and ability. Please send or fax a current resume, or vita and references to resumes@bfsa-ca.com or fax to 858-679-9896.

Brian F. Smith and Associates (www.bfsa-ca.com) offers consulting services pertaining to all aspects of paleontology, archaeology, biology, history, air, traffic, noise and investigations throughout the southwest, primarily in southern California. The combined experience of the principal consultants and associates represents over 100 years of involvement in the study of the history and prehistory of this region. BFSA's capabilities are highlighted by the range of current projects, including construction monitoring, data recovery mitigation programs, historical structure assessments**,** surveys and evaluations for both the California Environmental Quality Act (CEQA) and Section 106 of National Historic Preservation Act (NHPA).

The San Diego Natural History Museum is run and operated by the San Diego Society of Natural History, a private non-profit scientific organization incorporated in 1874. The Museum's mission is to interpret the natural world through research, education and exhibits; to promote understanding of the evolution and diversity of Southern California and the peninsula of Baja California; and to inspire in all a respect for nature and the environment.

Within the Museum, the Department of PaleoServices (DPS) specializes in paleontological resource management. Our focus is on the recognition, recovery, and preservation of the significant and unique paleontological resources that occur in this region. The activities of DPS are helping to preserve significant fossil assemblages and are directly contributing to the growth of the important paleontological research collections at the Museum. We are currently looking to fill the following position:

Paleontological Field Manager: Position responsibilities include coordination of paleontological field activities (i.e., supervision of field monitors in prospecting for and collection of fossils and the recording of stratigraphic, taphonomic, geographic, and topographic data) and production of final project reports that summarize the methods and preliminary results of paleontological salvage activities. Other duties include generation of initial discovery letter reports for City, County, and/or State agency managers and generation of paleontological resource assessment technical reports. Opportunities also include paleontological field work in the Southern California region and working with the extensive fossil collections of the San Diego Natural History Museum.

Qualified candidates must have at least a B.S. Degree in Geology or Paleobiology; 2 to 3 years of relevant experience (especially sedimentary geology and paleontology); excellent supervisory/managerial, verbal, written, and interpersonal skills; and a strong work ethic, intense drive, and initiative for quality and customer service. This position is a regular, full-time salaried position with a generous benefits package (e.g., full medical and 401K plan). Compensation will be based on individual qualifications and experience (annual salary range $40,000 to $60,000).

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1931, the Great Depression.

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***NEW POLICY**: Your membership dues include email delivery of the monthly newsletter. If you wish to receive a hardcopy of the newsletter through US Mail, please add $10.00 to your membership dues.*

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