UCLA
Earth & Space Sciences

Alumni Newsletter 1999

Chair's Letter . . .

As I write this, the Mars Polar Lander is about three million miles from its namesake planet where it will touch down on December 3rd. Unless this newsletter reaches you in Timbuktu, you will have surely heard about this event by the time you read my remarks. We are, of course, looking forward to the gentle descent of the lander onto the Martian surface, at which time **Dave Paige** and his UCLA team will begin their three month investigation of the present and past climate of our sister planet.

Looking back over the last year, much has happened in the Department that I'd like to bring you up to date on. Of the many honors bestowed on our faculty this year, no event gave us greater pleasure than being able to honor both **Margy Kivelson's** 70th birthday and election to the National Academy of Sciences on the same day! Margy's students and colleagues flocked from around the world to celebrate her remarkable career during a day long symposium and delightful evening banquet.

PHOTO BY KAREN McBRIDE

I am pleased to tell you that **Didier Sornette** joined our faculty fulltime this quarter. Didier's investigations of "self-organization and scale invariance in complex phenomena" have led him to find linkages between phenomena as varied as earthquakes and financial crashes; he's promised to give our alumni advance warning of both! He is joined in this area by Professor-in-Residence **Vladimir Kelis-Borok**, one of the true icons of mathematical geophysics. During a three year stint as Professor-in-Residence, K-B (as he is universally known) plans to address one of the most significant (and controversial) problems in physical sciences; anticipating, and thus potentially mitigating, catastrophic earthquakes. **Ray Walker** also joins us this Fall as Professor-in-Residence in space physics. Ray is a world leader in modeling the magnetospheres of the Earth and Jovian satellites and will help shoulder the teaching responsibilities of the geophysics and space physics programs. Active searches continue in neotectonics, space physics, and astrobiology.

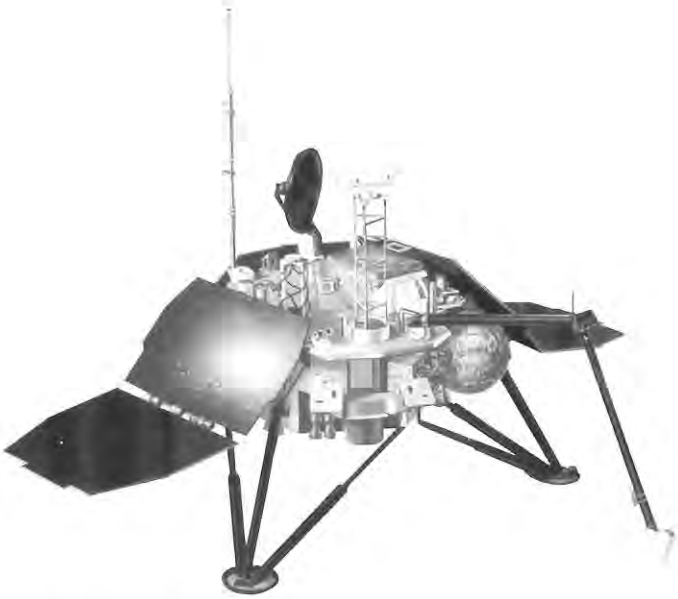
We are most grateful for the extraordinary response of our alumni in supporting acquisition of our growing fleet of four-wheel-drive vehicles (the third 4x4 was delivered last month). This is a wonderful example of how—in the face of ever reducing state support—the extended E&SS family can help maintain the excellence of our teaching programs. The response of our former graduates to the Distinguished Alumni Lecture series has also been heartening, and continues to provide us with a collegial opportunity to renew old acquaintances and discover the role you wish to play in our future.

While the fortunes of, say, college football teams wax and wane, the Department of Earth and Space Sciences has been able to keep its commitment to excellence in teaching and research for over half a century. As you learn of the results of the Mars mission through the media, you have every reason to take pride in the accomplishments of your Department, and we greatly appreciate your help in maintaining the vitality of our program.

All the best for the new millennium.

Mark Harrison

Mark Harrison, Chair



The Mars Polar Lander with the Mars Volatiles and Climate Surveyor (MVACS) Payload in deployed configuration.

On the Cover—

The Mars Polar Lander

The **Mars Polar Lander** was launched from Cape Canaveral on January 3, 1999. Don't confuse the Lander with the Mars Climate Orbiter, which was lost on September 23rd when it entered the Martian atmosphere due to miscalculations caused by the failure to convert measurements from metric to English. The Mars Climate Orbiter was to have served as a relay for the Lander before beginning its own two-year survey of the Martian atmosphere and weather. The Global Surveyor, which has been orbiting Mars since 1997, is expected to serve as a relay station in place of the lost Orbiter.

The Mars Polar Lander is scheduled to touch down on the surface of Mars on December 3, 1999—so by the time you read this, you will know whether the landing was successful or not. It will be targeted to a landing site in the south polar region of Mars near 76 degrees south latitude and 195 degrees west longitude. This site is on the unexplored polar layered deposits—a location especially well suited for studies of Martian water and climate. At this site, the sun will always be above the horizon, providing a constant source of solar power for the Lander's operations for the duration of the mission. During the Lander's 90-day lifetime, the UCLA Mars Science Operations Center team—led by E&SS Professor **David Paige**—will send commands to the payload instruments and analyze the scientific data received. The **Mars Volatiles and Climate Surveyor (MVACS)** integrated payload package includes:

The **Stereo Surface Imager** will create panoramas and characterize the general environment of the landing site. When the mast on which it is mounted is fully extended, the two eyes of the imager will view the Martian surface from a height of about 2 meters, similar to the height of human eyes. The camera can take highly detailed images, allowing scientists to accurately measure the sizes of terrain features. With its array of filters, the camera will record the geological composition of the landing site, and the amounts of water and dust in the atmosphere;

A two-meter **Robotic Arm** will dig a trench up to 20 inches deep. As strong as a human arm, it will scoop up soil samples and deliver them to the **Thermal and Evolved Gas Analyzer,** which will heat the samples in tiny ovens, measure the amount of water vapor and carbon dioxide gas driven off, and determine the amount of ice in the samples—as well as minerals that may have formed at a time when Mars had a wetter, warmer climate. The **Robotic Arm Camera** will take detailed close-up color images of the surface and soil samples;

The Lander's **Meteorology Package** will function as a Martian weather station. The package is a collection of sensors at different heights on the Lander that will provide accurate profiles of temperature, wind, and water vapor from the surface to about two meters high. ❑

COVER PHOTO BY FIRST PHOTO STUDIO, COCO BEACH, FLORIDA

In this issue:

Production Editor:
Barbara Widawski

UCLA
Department of
Earth and Space Sciences

P.O. Box 951567
Los Angeles, CA 90095-1567

phone: (310) 825-1100
fax: (310) 825-2779
email: barb@ess.ucla.edu

PHOTO BY KAREN McBRIDE

Crossing the bridge on the way to the town of Namche Bazaar along the Everest route.

Student Profile—

Elizabeth Catlos

Elizabeth Catlos is a PhD student whose research involves deciphering the evolution of the megathrust that largely created the Himalayan mountain range. She says, "Our understanding of plate tectonic driven mountain-building processes is only as good as our knowledge of the timing of geological events. There are several gaps in the geological concensus about how plates interact and about the mechanisms involved when continents collide. The Himalayan mountain range is an ideal location to study this orogenic process."

PHOTO BY MARK HARRISON

Dr. Santa Man Rai and Liz Catlos hiking and doing geological field work in the Nepal Himalayas along the Everest transect.

The collision of India with Asia created the Himalayan range that now extends over 2,400 km from the Indus River in Pakistan to the Bramaputra River east of Bhutan. Metasedimentary rocks that once made up the leading edge of India form the summits of the Annapurna range in central Nepal and cap the peak of Mount Everest. Today, the range is characterized by a high rate of seismicity and rapid rate of deformation. The Main Central Thrust is the dominant tectonic structure of the range that formed as the northern margin of India telescoped. At most locations, the footwall is characterized by an inverted metamorphic gradient that has been conventionally interpreted as implying a once inverted geothermal structure (*i.e.,* hot rocks atop cold rocks). The results of Elizabeth's research indicate that the inverted metamorphism is more apparent than real, upending the traditional view and requiring substantial changes to the way we view the evolution of the Himalayan range.

The accompanying photos were taken this past spring as Liz surveyed the Dudh Kosi—the drainage leading to Everest base camp in Nepal—in the final field trip of her thesis research. "Our previous work in central Nepal indicated that the Main Central Thrust had been active about 10 to 18 million years more recently than previously reported. To explore the lateral extent of this exciting result, we chose to sample further east along the Everest transect. Ages of minerals that cannot be seen with the naked eye yielded significant insight into the evolution of the Himalayan mountain range and have implications for our understanding of how plates interact in collisional tectonic settings." ❑

Want to add your Web Page to the E&SS Alumni Web Pages?
(See http://www.ess.ucla.edu/alumni.html)
Please email Amy Dario at adario@ess.ucla.edu

W. Gary Ernst and Charlotte Ernst

Professor Emeritus John C. Crowell

Double the Fun—

Ernst Fund Dedication and Distinguished Alumni Lecture

Only a faint hint of that "new carpet smell" hung in the air of the Commons Room in the afternoon of Wednesday, October 6th, as alumni, students, faculty, and staff started gathering for the W. Gary Ernst Graduate Student Support Fund Dedication. Soon the room was filled to capacity, and **Mark Harrison** started the celebration by announcing that enough money had been collected to name the endowment initiated by Gary's former students and research associates on the occasion of his 65th birthday. This fund will be used to provide support to graduate students in petrology and tectonics.

Gary, who had been a Professor at E&SS from 1959 to 1989, started squirming in his seat when Mark made allusions to an old tradition involving pie-in-the-face. Once Mark produced the pie from behind the lectern for general consumption, Gary was able to relax and enjoy the remembrances of some of his former students: **Warren Thomas** (PhD '78) is now the MSO of the UCLA Chemistry Department, and had been the MSO at Earth & Space Sciences who helped **Charlie Gilbert** (PhD '65) set up the fund. **Patricia Colville** (MA '66) was Gary's first MA student, and now is a mineralogist with industry. **Juhn-Guang "Louie" Liou** (PhD '70) is now a fellow professor of Gary's at the Stanford Department of Geological & Environmental Sciences. **Bill Carlson** (PhD '80) is now a professor at the University of Texas, Austin, Department of Geological Sciences.

To keep all the compliments from going to Gary's head, his old compatriot **Clarence Hall** was called on to tell about some of Gary's "faults"—the only one of which Gary would deny was starting food fights, explaining that he was always too interested in eating it to ever waste food. Gary finally got to remove the tacky gold lame drape, unveiling the plaque of donor's names we'd all been waiting to see.

The meeting reconvened at the outdoor Amphitheater of the Fowler Museum, where more alumni joined the group to enjoy the balmy evening and delicious wine and hors d'oeuvres at the reception for the 1999 Distinguished Alumni Lecture.

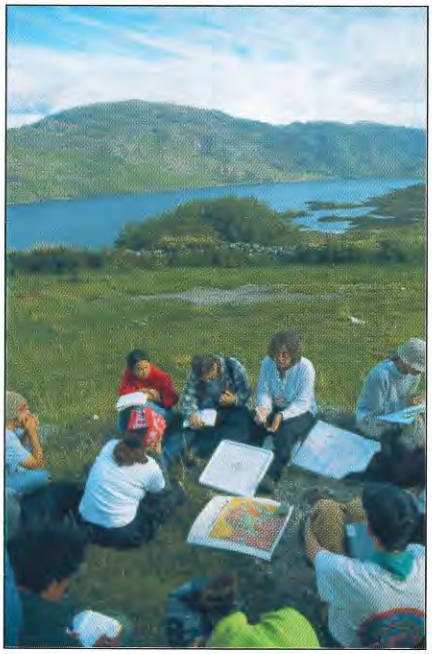
In the Lenart Auditorium, Professor Emeritus **John C. Crowell** (PhD '47) was introduced by an old colleague from his teaching days at UCLA—W. Gary Ernst! John Crowell received the second PhD degree ever awarded in Geology at UCLA. He subsequently served on the faculty at UCLA, including two stints as Chair, before moving to UC Santa Barbara. His distinguished career has been recognized with numerous honors, and he has been active in many societies at local, national, and international levels. At the age of 83, he maintains practical interests as a California Registered Geologist, Engineering Geologist, and Petroleum Engineer. Based primarily on field observations of structures and sedimentary strata, John has made major contributions to our understanding of the relations between tectonics and sedimentation, the nature of strike-slip deformation, the geometry of faults, characteristics of deep-marine sedimentation in tectonically active settings, and the paleogeography of ancient glaciations. His lifelong study of Ridge basin is a landmark in our understanding of relations between sedimentation and tectonics in strike-slip regimes. John's field work has taken him around the globe. He has recently turned to investigating the link between ice ages and climate change. John's lecture, "Ancient Ice Ages and Climate Change," showed how climate is the result of interwoven tectonobiogeochemical processes. It also explained some of the difficulties in collecting data.

John Crowell's new book, *Geological Society of America Memoir 192: Pre-Mesozoic Ice Ages: Their Bearing on Understanding the Climate System* will soon be available from the GSA. ❑

PHOTOS BY JON DAVIDSON AND NIKKI STULL

The class at Hutton's unconformity, where James Hutton reportedly demonstrated the profound extent of geological time.

Natalie Caciagli leads the class in an impromptu seminar at the Stack of Glencoul—thrust faults cut the hillside in the background.



Intrusive relations in gabbro/ basalt of the Mull Tertiary igneous complex, Hebrides, Scotland—grad student Justin Simon points out dike contacts, with other internal contacts shown by Natalie Caciagli and Amy Young (back).

Field Seminar in Britain

Jon Davidson

The second E&SS field trip to northern Britain, run as the Field Seminar class, comprised a lively group of 7 graduate and 11 undergrad students. It was led by ***Jon Davidson****, with grad student* ***Amy Young*** *serving as trip treasurer and co-organizer.*

An introduction to the geology of northeastern England, based at the cathedral city of Durham, was followed by a visit to some of the sacred shrines of geology—Hutton's unconformity at Siccar Point, Hutton's Rock at Salisbury Crags, and Arthur's Seat in Edinburgh. After heading northwest onto the Scottish Island of Mull, we were lashed by a vicious gale—but not deterred from examining the spectacular geology. We saw the igneous rocks emplaced at volcanic centers formed 60 million years ago as Britain was rifted away from Greenland in the formation of the north Atlantic Ocean, as well as the classic aluminosilicate triple point manifest in metamorphic rocks of the Ross of Mull granite contact aureole.

Further northwest, we visited the windswept region around Ullapool where battered Precambrian gneisses are overlain by dramatic pinnacles of Late Precambrian Torridonian sandstone. The main geological feature here is the Moine Thrust, a product of the 400 Ma Caledonian orogeny which has brought rocks of the orogen northwestwards over undisturbed sediments of the foreland.

A frantic journey southwards through Scotland brought us to the Lake District, and a mixture of inclement weather and fantastic scenery. Effects of the last ice age are carved deeply in the land here, while the rocks are part of a Caledonian arc. Despite being 400 Ma old, the delicate sedimentary and volcanic features are comparable in quality with those of modern volcanic deposits. Our final stop was in the Yorkshire Dales—a dramatic change in scenery to broad limestone hills with caves and waterfalls. The rocks told a story of post Caledonian block and basin tectonics, controlled by deep granite bodies, which to this day remain buried beneath the hills. We'd like to thank friends in Britain—Brian Taylor, Dougal Jerram, Steve Caunt and David Sharrod—for helping lead various parts of the trip, and the Office of Instructional Development at UCLA for funding. ❑

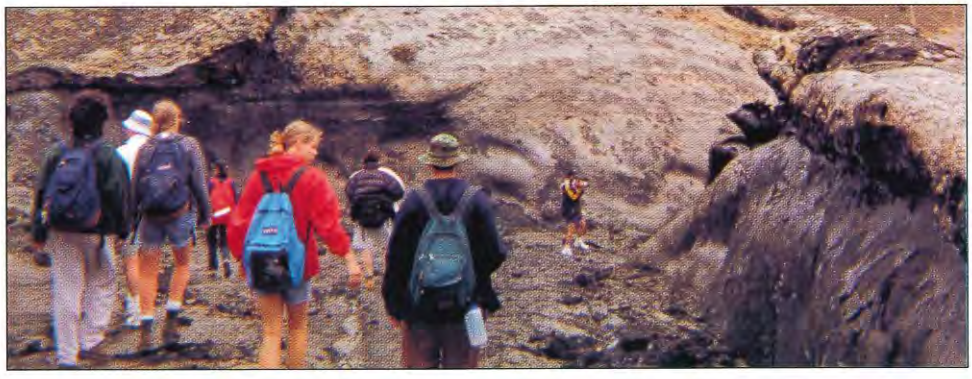
Cool—Mary Reid and Kari Cooper at Kona.

PHOTO BY MIKE MURPHY

Hot—Skylight on Kilauea.

PHOTO BY JEREMY BOYCE

Students approaching lava wash at Kilauea; Val videotaping (right, far distance).



Eight Days in Paradise

Mary Reid

One of Professor ***Mary Reid's*** *many research interests is island volcanism. With the help of teaching assistants* ***Jeremy Boyce*** *and* ***Kari Cooper****, Mary led her Igneous Petrology class and six graduate students on a field trip to Hawaii last Spring. The following are Mary's recollections of the trip.*

Day 1: Early flight. No reservations for Hilo? Where's my luggage? Val videotaping. U. Hawaii. Ken Hon's overview—"Ball bearings and watermelons." A Hawaiian grocery store with no bananas? Parking lots. Kilauea Military Camp (KMC). Nice rooms. Long day.

Day 2: Kilauea overlook. It's only a couple of miles. Pahoehoe. Val videotaping. Steam cloud. No lava. Feeling lost. Unstable ground? Hot rocks. Lots of lava! Rock forming before your eyes. More hiking. Skylight! 1070°C. Longer hike. Sunset. Still hiking. Spaghetti feed. Late night.

Day 3: Kilauea round-and-round. Tour Hawaii Volcano Observatory (HVO) with Arnold Okamura. Val videotaping. Halemaumau. Pyroclastics. Sloshing lava. Tree casts. More pit craters. More young lava. Collapsing volcanoes. Reticulite. A'a. Burrito feed. Cheryl Gansecki's hot lava videos. Late night.

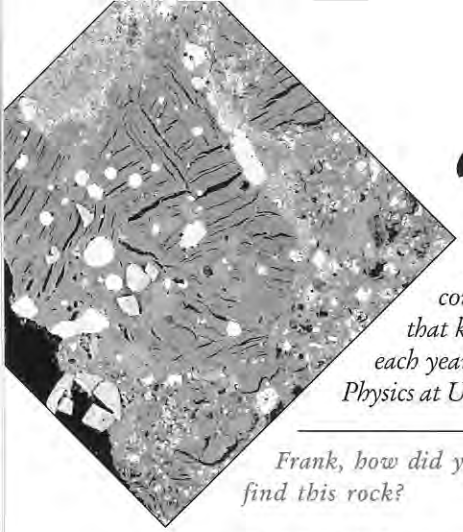
Day 4: Pick up vans. Parking lot. Saddle Road. Pu'u Huluhulu (very shaggy hill). Dikes? Flows? Agglutinate? Myles vaulting. 13,796 feet up Mauna Kea. Lava tube. Videotape rolling. Skylight. Shimmy down tree. Dinner in Hilo. Long drive home.

Day 5: Hawaii Scientific Drilling Program site. Hard hats—drill cores. Val videotaping. North to Kohala. Waimea overlook. Benmoreite dome. Cinder cone. Tim shows off—three broken toes! Parking lots. Kona Hospital+Denny's. Late night.

Day 6: KONA! Sleep-in. Coral beaches . . . Swimming . . . Frisbee . . . Kayaking . . . Spinner dolphins . . . Snorkeling . . . Shopping. Discount sushi+the Italian restaurant next door. Dancing. Very late night.

Day 7: North to Hualalai. Trachyte. Xenoliths! Xenoliths! Xenoliths! South to Mauna Loa. More parking lots. Val videotaping. Leap off South Point—Kari nose dives. Getting dark. Carry Tim to Green Sand Beach. Really dark. Hiking still. Carry Tim back from Green Sand Beach. Everyone safe and accounted for. Long drive to KMC. Not-so-nice rooms. Very late. Sleep? Or eat?

Day 8: Early flight. Long eventful trip. Sleep . . . Sleep . . . Sleep. ❑



"Killer Asteroid" Found!

Frank Kyte

Adjunct Associate Professor ***Frank Kyte*** *(PhD '83) created a big stir in the scientific community and the media last year when he reported the discovery of a small piece of the asteroid that killed the dinosaurs. Frank teaches Oceanography to about 400 E&SS undergraduate students each year. He is also an Associate Research Geochemist in the Institute of Geophysics and Planetary Physics at UCLA, and runs the electron microprobe facility in E&SS.*

Frank, how did you find this rock?

I was trying to find the Cretaceous/Tertiary (KT) boundary in several old cores from the Pacific, to study the composition and abundance of ejecta from the KT boundary impact over a large area of the Earth's surface. I knew of a few core sites where the sediments were fine-grained clays, and the locations of the KT boundary were only known to within a few meters based on studies of fish teeth, the only microfossils available in these sediments. I was able to locate the KT boundary by the presence of a large iridium (Ir) anomaly. When I went back to the core from Site 576—a core drilled in 1982—to resample sediment for ejecta phases, I noticed something unusual on the surface of the core.

These sediments are typically a very fine-grained chocolate-brown clay. The color comes from oxidized iron and manganese in the sediments. At the exact depth where I had found the Ir anomaly, I noticed a patch of light-colored clay in which I found a small rock, about 2.5 mm in diameter. This was 1,000 times larger than the typical clays in this sediment and 10 times larger than the ejecta debris I expected to find. Such a large particle could not have been transported to the center of the Pacific by winds. It had to be a meteorite that fell through the atmosphere or a large piece of ejecta from the Yucatán Peninsula impact.

What evidence do you have to support it's being a meteorite?

First, is its large size. Second, the concentrations of Ir and some other elements at levels similar to those found in common types of meteorites. Third, it had textures similar to those found in certain types of meteorites called carbonaceous chondrites. The original meteorite minerals had been altered to clay minerals and iron oxides, but pseudomorphs of the original textures remained (see figure). Small patches of oxides are pseudomorphs after meteorite metals and some of these even contain micrometer-sized inclusions of pure nickel, which I believe are residues that remain from nickel in the original metal. Large areas of clays with sharp boundaries are pseudomorphs after euhedral olivine which is found in a fine-grained matrix. Also, most of the clays are a mixed glauconite-illte, a phase never found in oxidized deep-sea clays. Glauconite usually occurs only in reducing environments and this is evidence that the original metal in the meteorite altered the microenvironment surrounding this small rock. This also explains why the clays around this rock were light colored, and not dark brown like the rest of the sediments—the reducing environment at the surface of this rock dissolved the iron and manganese oxides in the adjacent sediments.

What makes you think it's a piece of the asteroid that killed the dinosaurs? It was 9,000 km west of the impact.

Supercomputer models of the KT impact and laboratory simulations have shown that pieces of an impacting asteroid can survive a hyper-velocity impact, particularly if the projectile comes in at a low angle. Also, there was another impact in the late Pliocene, about 2 million years ago, from which I have recovered a large number of meteorites, typically 1 to 5 mm in size. Small meteorites can definitely survive and become part of the ejecta. The odds that this is part of the ejecta rather than just some stray meteor that happened to fall into sediments that contain the KT boundary are at least 100 to 1, probably much larger. The KT asteroid brought an enormous amount of meteoritic material to Earth all at once, compared to the normal background flux. Also, millimeter-sized meteorites are most likely to be destroyed by severe heating during atmospheric entry.

Why do you say this meteorite came from an asteroid and not a comet?

The textures I found are typical of known types of meteorites that are likely to be from the asteroid belt—a dense, metal-bearing carbonaceous chondrite that formed on an asteroidal parent body that experienced alteration in the presence of liquid water. I also found a patch of saponite, a clay mineral commonly found in carbonaceous chondrites. These characteristics are very different from those expected in cometary materials which are believed to be porous, and composed on anhydrous (water-free) mineral assemblages.

How important is the asteroid vs. comet distinction?

Many scientists claim the KT boundary impact may have been part of a large shower of comets, and that comet showers occur every 25 to 30 million years. These hypotheses invoke periodic disturbances of the comet cloud that exists beyond the orbit of Pluto, which are supposedly caused by a dark companion star to the Sun, an undiscovered tenth planet, or by oscillation of the solar system across the galactic plane. If the KT projectile was from an asteroid, all these hypotheses would be as extinct as the dinosaurs. ❑

Scientists in the Real World—

Unraveling the Truth about the 1998 Indo-Pakistani Nuclear Tests

John Vidale

In May of 1998, India, then Pakistan, exploded underground nuclear test devices. The blasts tested their nuclear technology and also served notice to other countries that they had entered the ranks of the nuclear powers. Earth & Space Sciences' ***John Vidale,*** *Professor of Geophysics, explains some of the ramifications of the recent testing from a seismologist's point of view.*

Isn't this a political issue? Why were scientists drawn into the debate?

The reports from monitoring stations did not match the claims of the Indian government. Consequently, conservative politicians in the US argued that the monitoring stations are not performing well, and are thus incapable of enforcing a test ban treaty.

How do we monitor nuclear testing?

The United Nations runs the International Monitoring System (IMS), which listens for ground vibrations from underground nuclear tests. The IMS also has listening stations in the oceans for underwater tests and above ground to measure sound waves. Other instruments search the air for radionuclides formed by fission. The ground-vibration sensors—seismometers—provided the alert that the first explosions had occurred on May 11, 1998. Within an hour, experts were reviewing recordings of the ground motion to assess their source. An explosion with the strength of 15 kilotons (the equivalent of 15,000 tons of TNT) was their verdict.

And the controversy?

The Indian government reported three simultaneous explosions with a combined strength of 60 kilotons, claiming that the explosions were four times more powerful than indicated by the seismometers. Stranger still, they reported two more explosions two days later, which were not detected. While the later explosions are claimed to have been small, about 0.5 kilotons, according to UN experts, they should have been readily visible.

The Pakistani government then set off their own explosions?

The Pakistanis claim five explosions on May 28th and 30th. There are no scientific discrepancies with these explosions; the Pakistani government won't talk about them. We have less data to examine than for the Indian blasts, because the Pakistanis unplugged the closest seismometer two hours before the tests. They were kind enough to plug it in again afterwards!

Can we check what really happened in the Indian nuclear tests?

An on-site inspection, as required by the Comprehensive Test Ban Treaty (CTBT) could help. Unfortunately, neither India nor Pakistan has signed the treaty, and they are not willing to have on-site inspections.

Do nuclear tests help your research in the E&SS Department at UCLA?

I have conducted several studies using them. Nuclear explosions generate a tremendous burst of vibrations in a fraction of a second. One of my studies, which was reported on *CNN*, *NPR*, and in *Time Magazine*, used the roughly one-megaton explosion ignited by the Chinese government in 1990 to capture a high-resolution glimpse of the boundary between the core and the mantle. That explosion was a hundred times more powerful than the tests conducted by the Indians and the Pakistanis.

What's going on down there?

The core-mantle boundary (CMB), halfway between the surface and the center of the Earth, divides solid rock in the mantle from liquid iron in the core. My studies support the emerging consensus that the bottom of the mantle is an exciting place, with pods of partially melted rock, strong variations in the chemistry of the rock, and possibly vigorous small-scale convection stirring the rock to allow the heat from in the core to escape.

Is it as exciting as the surface where we live?

It's inhospitable, nearly 3,000° C and with unimaginable pressure from 3,000 km of rock overhead, with molten iron just underneath. I'd rather be up here, but earth scientists are now very curious to get a better look down there. There could be morphologies like volcanoes, rivers of hot lava and iron, and sludge raining up from the core at the CMB.

That's quite a vision to build from echoes of vibrations set off by nuclear tests. Do seismologists wish for more nuclear tests to generate more data?

Remember, we're the same experts who have worked for many years to demonstrate the possibility of a treaty to ban nuclear tests. If a CTBT stops nuclear testing, we will have contributed to the general welfare of the people on Earth, as well as to a better understanding of the Earth's interior. The CTBT enjoys the support of our leading professional societies—the American Geophysical Union and the Seismological Society of America. Unfortunately, the Senate voted down the CTBT on October 14, 1999 for political reasons. ❑

Class of '99—New Graduates, Faculty, and Awardees at the 1999 E&SS Commencement Celebration Brunch, June 20, 1999. Frank Tepley was also celebrating his first Fathers' Day with his two-week-old daughter Sana (right).

Honors and Awards—1999

John W. & Frances R. Handin Scholarship

Presented to undergraduates for scholastic excellence, this scholarship was endowed by Department alumnus John W. Handin (BA '42, MA '48, PhD '49) and his wife, Frances.

Justin Rubinstein

Wilbur B. Sherman Scholarship

Awarded to undergraduate and graduate students for demonstrated academic achievement, this scholarship was endowed by Department alumnus Wilbur B. Sherman (BA '40).

Atoka Kumagai

Eugene B. Waggoner Scholarship

Awarded to an undergraduate for academic excellence, this scholarship honors the memory of Department alumnus Eugene B. Waggoner (BA '38, MA '39).

Brian Viggiano

Clem Nelson Summer Field Award

Conferred for scholastic excellence to summer field students, this award is generously supported by Professor Emeritus Clem Nelson's former field students and associates.

David Glass

Earth & Space Sciences Degrees Conferred 1998-99

Doctor of Philosophy

Thomas Kevin Kelty *Explanation of Coeval Normal and Thrust Faulting in the Mauna Loa-Kilauea Rift System (Hawaii) by an Elastic Wedge Model and Sedimentological Controls on the Permeability Structure and Correlation within the Fluvial-deltaic, Palm Spring Formation, Mecca Hills, California* (Professor Yin) *Geology*

Xiao-xi Ni *A Vane Model for Earthquake Ruptures* (Professor Knopoff) *Geophysics & Space Physics*

Adrienne Momilani Ono *Solar Reflectance Measurements of Calibration Targets and Martian South Polar Frosts* (Professor Paige) *Geophysics & Space Physics*

Mark Ian Richardson *A General Circulation Model Study of the Mars Water Cycle* (Professor Paige) *Geophysics & Space Physics*

Peter Edwin Rumelhart *Cenozoic Basin Evolution of the Southern Tarim: Implications for the Uplift History of the Northern Tibetan Plateau* (Professors Ingersoll and Yin) *Geology*

Frank James Tepley, III *Plagioclase Isotopic Heterogeneities in Continental Volcanic Arc Rocks* (Professor Davidson) *Geochemistry*

Michael James Vendrasco *Early Evolution of the Polyplacophora (*Chitons*)* (Professor Runnegar) *Geology*

Stephen Edward Wood *Nucleation and Growth of CO_2 Ice Crystals in the Martian Atmosphere* (Professor Paige) *Geophysics & Space Physics*

Master of Science

Shirley Alice Baher (By Comprehensive Examination) *Geophysics & Space Physics*

Janet Carol Green (By Comprehensive Examination) *Geophysics & Space Physics*

Theresa Marie Heirshberg *Actualistic Petrofacies Analysis of the Pliocene-Pleistocene Saugus Formation, Ventura Basin, Southern California: Implications for Provenance Paleotectonics and Paleogeography* (Professor Ingersoll) *Geology [1997]*

Fotios Konstantinidis (By Comprehensive Examination) *Geophysics & Space Physics*

Li Ma (By Comprehensive Examination) *Geophysics & Space Physics*

Erika Lehua Parkin *Tectonic Controls on the Pliocene to Quaternary Stratigraphic and Structural Evolution of the Bahia de Guadalupe Basin, Baja California, Mexico* (Professor Axen) *Geology*

Steven Eric Persh (By Comprehensive Examination) *Geophysics & Space Physics*

Patricia Elizabeth Weston *Temperature, Timing and Fluid Composition Constraints for High Temperature Fracturing and Hydrous Mineral Formation in Gabbros from Hess Deep* (Professor Manning) *Geology*

Fei Xu (By Comprehensive Examination) *Geophysics & Space Physics*

Richard S. Zuelsdorf (By Comprehensive Examination) *Geophysics & Space Physics*

Bachelor of Science

Jennifer Christine Anthony *Geology*

David Wayne Boone *Geophysics & Space Physics/Biology*

Jamie Todd Buscher *Geology*

Nicole Angela Coan *Geology/Civil Engineering*

Bryan Keith Eytcheson *Geology*

David Andrew Glass *Engineering Geology*

Paul Anthony Gutierrez *Geology*

Adrian Michael Keller *Engineering Geology*

Hyun Jin Kim *Engineering Geology*

Nicole Cristina Lautze *Geology*

Genevieve Kyla Liang *Geology/Geography*

Ian William MacMillan *Geology*

Jason Daniel Mejia *Paleobiology*

Kelley Ann Moore *Geology*

An T. Nguyen *Applied Geophysics*

Terrence Lee Northrup, Jr. *Geology*

Mary Kay Penny *Geology*

Kelly Ann Pollack *Geology*

Paul Francis Thaler *Paleobiology/Biology*

Brian Charles Wilbur *Paleobiology/Biology*

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Alumni News

1935

Richard H. Hopper, BA (MA '36), spent 23 years working for Caltex Petroleum Corporation in Indonesia (1938 to 1961). He was in the US Army out there from December, 1941 to September, 1945). In 1961 he was transferred to the New York headquarters of Caltex (which is now in Dallas). He retired in 1979, and now lives in Fairfield, Connecticut. Richard has not been back to LA since 1938, and believes that it must have changed a lot!

1936

Robert L. Johnston, BA (MA '38), is actively enjoying his retirement. He says, "My ex-boss (Gulf Oil) and I are having fun wrestling the complex geology of southern California and down into Baja. Sure is relaxing to do it at a leisurely pace without budget reports, etc."

1939

Joseph W. Kean, Jr., BA, is "still surviving from a heart attack in April of 1998," at the age of 82. He is trying a new diet and exercise program, which seems to help. He tells us that he is blessed by a large family of five sons, four daughters, and thirteen grandchildren. The photo here is his retirement picture from 1960, when he retired as a Lieutenant Colonel of the US Marine Corps.

1947

Robert D. Trace, MA, recalls being shipped out after graduating at UCLA by the USGS to Grand Junction, Colorado, where he met up with Gordon Weir (BA '47). He ran into Gordon again, in 1997, at the USGS's 50-year reunion of people on the Colorado Plateau Uranium Project. Bob also saw another UCLA alum last year, John Wiese (BA '40, MA '41, PhD '47).

1948

Harold K. Stager, BA, is retired after 35 years with the USGS, and frequently gets together with Gordon Weir (BA '47), who is also retired from the USGS, to talk over old times.

Max Carman, BS (PhD '54), recently took a fieldtrip across the Andes in connection with the Latin American Geological Congress, which was led by Victor Ramos. The same trip will be given at the 31st International Geological Congress in the year 2000, and he highly recommends it—he says that Ramos is fantastic!

1950

Brad Johnson, BA (PhD '54), and his wife Carole (PhD '51) are enjoying "the village life" in Ojai.

Joseph W. Kean, Jr.

Arthur Mirsky, BS (MS '55, PhD '60), has been married to his wife Patricia for 37 years. Retired since 1994, he's a Professor Emeritus at Indiana/Purdue University. He's completed a revision of his 1992 guidebook, *Building Stones in Downtown Indianapolis*, which will be a fieldtrip for the AAPG-East annual meeting in Indianapolis.

1951

Norman Bradley, BA, has been retired for 14 years, having worked for two years at Mobil Oil, and 32 years at the LA County Flood Control District. At one time in the 1950s, several UCLA alumni were working with him in the Water Conservation Groundwater Group—Harry A. Kues (BA '49), John Roth (BA '51), Bill Lundeen (BA '52), and Bill Young (BA '53).

Tod P. Harding, BA (MA '52), fully retired last year, after 46 years pursuing geology for Exxon. Well over half this effort was spent on structural geology in sedimentary basins outside of the United States—this provided an opportunity for wide geologic exposure and contact with diverse cultures and countries.

John M. Vollmer, BA, has been retired from Chevron for ten years, where he was last the Chief Development Geologist of the Western Region. He recently moved with his wife Alice to the retirement community of Rossmoor in Walnut Creek, California.

1958

Joe Galbreath, BA, works at the Primex Aerospace Company, making the control engines that steer spacecraft on their way to Mars.

W. Edwin Sharp, BA (MA '60, PhD '64) is retired from the University of South Carolina after teaching mineralogy and economic geology for 32 years. He coauthored with Cornelius Hurlbut the fourth edition of *Dana's Minerals and How to Study Them.*

1959

Glen C. Ware, MA, retired in 1992 as Exploration Manager for the Western Hemisphere in Texaco's Frontier Exploration Department. He "had a great 36-year career doing exploration world-wide, thanks to the likes of Crowell, and Winterer, and Putnam, in fact, the whole Department. And Texaco." Glen and his wife Lucille are now in the Woodlands, Texas, where "Houston is a suburb." He is in the AAPG House of Delegates and is Director of the Explorers Club Texas Chapter.

1965

Ed Bates, MS, "got a chance to reassess" his career in the 1980's oil slump. After obtaining a provisional teaching certificate in 1988, he opted to work as a tax preparer for H&R Block. Ed moved to Trinity County, California in late 1991 to semi-retire, but he purchased an H&R Block franchise in 1992, and is working harder now than before. He was recently appointed to the Trinity County Natural Resources Advisory Council.

1968

Gary Raines, BA (MS and PhD from the Colorado School of Mines in 1970 and 1974), is a research geologist for the USGS stationed at the University of Nevada Reno where he is also an Adjunct Graduate Professor. His research involves GIS applications in mineral and environmental assessments, the major focus of which is the integration of geologic information to predict the location of undiscovered mineral deposits. Gary chaired a committee to define digital geologic map standards for North America, and has been advising the government of Saudi Arabia on the development of a national geologic GIS.

1969

David H. Scott, PhD, is retired from the USGS Branch of Astrogeology, where he was Project Chief of the Mars Geologic Mapping Program.

Joe M. Straus

1972

Joe M. Straus, PhD, was named senior vice president of The Aerospace Corporation's Space Systems Group, which works with the US government to develop military satellites and their launch vehicles, ground control, and support network. He joined the Aerospace Corporation, an independent, nonprofit firm that provides architecture, engineering, and scientific support to national security space programs in 1973 as a member of the technical

In Memoriam

Flint Agee (BA '33) passed away about 1994. He had been retired from a very responsible position at United Geophysical, and had worked as a consultant subsequent to his retirement. [by Norman Bradley]

Charles A. Barta (BA '29) died April 30, 1999. He had been a Black C recipient and a member of the Zeta Psi fraternity. [by Ruth Barta]

Myles A. Colligan (BA '40) was an independent petroleum geologist operating in Texas and New Mexico. His first assignment was to Midland, Texas, as District Geologist for Wilshire Oil Company of Los Angeles. He died in Alameda, California on January 12, 1999. [by Coralee E. Colligan]

Jack Cunningham (BA '52) passed away January 9, 1998. He had been proud to be a Bruin. [by Diane Cunningham]

Leroy E. Foster (BA '57) died on September 24, 1998, at the age of 66. [by Sharon Foster]

Erle P. Halliburton, Jr. (BA '41) died at the age of 81 on March 27, 1998. He had been a longtime resident of Corona del Mar, California. Erle and his wife Donna had six children and five grandchildren. He was a member of the Kappa Sigma fraternity at UCLA. During World War II, he served as Captain of a US Army Transport Vessel. He worked as General Manager of the Manufacturing Division of Halliburton Luggage Company and Vice President of the Halliburton Portland Cement Company in Corpus Christi, Texas. [by Robert D. Johnston]

Randall C. Hatton (BS '69) passed away on January 1, 1998. He had worked in the aerospace industry at Lockheed, as a design specialist.

Thomas A. Oliver (PhD '52) died an accidental death at the age of 72 on October 2, 1997—four weeks after successful surgery, which relieved many of the problems of Parkinson's Disease. After graduating from UCLA, he worked as a geologist for seven years with Chevron. He joined the University of Calgary in 1957, where he founded the Geology Department. He taught and did research there for thirty years, holding the positions of Department Head, Academic Assistant to the Vice President, and Dean of Science. He was married to his wife Margaret for 43 years, and they had four children. [by Margaret R. Oliver]

Constance K. Ring (BA '57) died on January 6, 1997 at the age of 65. Her last residence was in Vienna, Virginia. [by Herbert Ring]

Wilbur B. Sherman (BA '40) passed away on August 27, 1998, following a stroke he suffered the preceeding June. He served as a Lieutenant Colonel in the Army Air Force during World War II. He was Vice President and Director of DeGolyer and McNaughton, Inc. from 1949 to 1958; President, Director, and Chief Executive Officer of the Panoil Company from 1959 to 1971; an oil and gas producer and petroleum consultant from 1971 to 1977; President and Chief Executive Officer of Tenexplo Corporation from 1978 to 1986; and a petroleum consultant and oil and gas producer from 1987 on. He was active in many professional associations, and was made a Fellow in the American Association for the Advancement of Science in 1991. He served on Earth & Space Sciences' Advisory Council; and in 1984, he endowed the Wilbur B. Sherman Scholarship.

Rayman Sturdevant (BA '39) died October 28, 1996.

Lawrence C. White (BS '52) died on November 15, 1998, at the age of 72.

staff, and worked his way up from there. Joe has served as principal director of the corporation's Communications Systems Subdivision, general manager of the Electronic Systems Division, general manager of the Space-Based Surveillance Division, and vice president of Space Program Operations.

Summer Field class of 1973 on a marginal structure of the Papoose Flat pluton

1973

James A. Goodrich, BS, and his wife Cindi (BA math, '73) are celebrating their 25th wedding anniversary by sailing their 42-foot sailboat "Moonspun" around the world over the next five years. Along the way, Jim plans to finish his novel, learn to play piano, learn French, and assist rural villagers with water and wastewater problems!

1976

Stevan Paul Dumas, BS, was married in 1995 to Julie A. DeLilly, an alumnus of Howard University. They had their first child, Evan, in October of 1997, and are expecting their second late in January 2000. Steve has discovered that parenthood in your 40's is hard on the body, knees, back, and shoulders, not to mention sleep! In the world of dentistry he's "achieved a limited amount of respectability while serving as a lecture host for both the state (CDA) and national (ADA) dental associations." At the October 1998 ADA Convention in San Francisco, he saw fellow geology alumnus, Kenneth Shay, BS '74, who has become an expert in the field of geriatric dentistry, and was giving a presentation at the convention.

Stevan, Julie, and Evan Dumas

1977

Robert MacDonald, MS, retired from the Department of the Interior in 1994. He brought us the photo of the 1973 Summer Field class on a marginal structure of the Papoose Flat pluton. While they were mapping they were too busy to enjoy anything, so Clem Nelson took them on a tour to enjoy the view afterwards.

1979

Kon-Kee Liu, PhD, teaches chemical oceanography at National Taiwan University. His research is aimed at understanding the biogeochemical cycles at continental margins. He is on the Scientific Steering Committee for the Joint Global Ocean Flux Study. He and his wife Margaret, a psychologist, have three sons, ages 3 to 17. He spent his sabbatical year at Horn Point Laboratory of the University of Maryland Center for Environmental Science. He developed a numerical biogeochemical model for one of the largest marginal seas (the South China Sea). It will be used to investigate how the carbon cycle may be affected by atmospheric forcings, such as El Niño events. He initiated a mini-reunion of alumni in Reston, Virginia. One of these was Dave Kosiur (PhD '78), a successful freelance writer. They noticed that the *Baltimore Sun* carried an interview of Cherrylene Lee (MS '79), and were amazed by her new career as a playwright!

1980

Joe Polovina, MS, recently returned to the US from Argentina, where he managed an exploration program in Patagonia for a junior gold mining company. He and his friend Carol visited with Bob and Vicki (Doyle) Jones, both ex-E&SS staff members—he hadn't seen them in 19 years.

1981

Wayne Sawka, MS, operated his own Government Relations and Marketing company for three years, then joined Emerging Technologies Institute in Sacramento, to get away from too much travel and paper work. However, after only three months, he was put in charge as Executive Director—back to budgets, human relations, politics, and travel! He says that arranging venture capital and angel invest-

ments for start-up companies is great fun, though, and they have even evaluated a few environmental and earth science start-ups, but their focus is on "agri-technology" software and media. He found it very hard to make the transition back into "western capitalism," after vacationing in Nepal and climbing with a Tibetan Buddhist Sherpa guide. Wayne's wife Paula works for the State of California supporting both the Assembly and Senate on large database projects.

1985

Eric B. Rehwoldt, BS (MS '89), is an Associate and Geoscience Technical Service Area Leader at Schnabel Engineering Associates, in Bethesda, Maryland. He and his wife Carolyn, a physical therapist, have two children—Miles (5) and Teresse (3); their third was due in May.

1988

Stephen H. Pay, BS, and his wife and daughter live in the Bay Area. He is an Associate Health Physicist for the Radiologic Health Branch of the California Department of Health Services. He spends a great deal of time inspecting UC San Francisco, UC Berkeley, and Stanford—and he says that they're not always happy to see him!

1990

Dave Diamond, PhD, is still doing "dirt geology," or, he says, "more like dirty water geology" in the environmental field, learning a bit of remediation engineering, and spending time with alum **Bruce Bilodeau** (MS '81).

Please help us find a "lost soul" . . . We've lost contact with:

Adams, John '52
Anderson, Louise '85
Anderson, Richard '56
Anderton, David '80
Andre, William '59
Ardavanis, Jerome '53
Bailey, William '31
Baranyi, Thomas '58
Bartow, John '64
Bellesi, Louis '58
Berman, Richard '77
Binder, Michael '73
Bird, Cyril '57
Blanks, Bobby '59
Block, Marta '77
Block, Susan '73
Brody, Kenneth '69
Brooks, Tennant '42
Brooks, Thomas '81
Brown, Richard '59
Bryson, Dean '53
Bush, Gordon '56
Chen, Richard '92
Cheng, Hsueh-Cheng '71
Christler, Harold '37
Clements, James '65
Coates, Donald '69
Cooper, Earl '39
Corvino, Claude '77
Czel, Louis '58
Dailey, Donald '60
Daum, Richard '37
Davis, Thomas '75
Delsasso, Richard '56
Dohlen, Howard '50
Dragila, Maria '84
Drescher, Thomas '52
Dryden, John '52
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Emerson, William '49
English, Todd '85
Erickson, Harold '58
Ericson, Lars '59
Farmy, Hossein '53
Flinnerty, Anthony '76
Foley, Jr., Walter '43
Fouda, Ahmed Ali '73
Freedman, Karen '78
Freitag, Arthur '59
Garton, Paul '41
Gauntt, Grover '42
Gerard, Matthew '80
Grady, John '47
Gunther, Richard '76
Hagerman, Gerald '60
Haines, Laurie '84
Halpern, Henry '81
Hangen, Donald '52
Hanson, Bruce '53
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Harville, Lee '69
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