



The Smilodon

The Princeton Geosciences Newsletter—Fall 2003 Vol. 44 No. 2

Jason Morgan Retires



Eva Groves

Jason Morgan *64.

By the end of January **Jason Morgan** *64 will be initiating many changes. First, he retires from Princeton 44 years after arriving in town and after serving on the faculty for almost 37 years. Second, he flies to Germany to take up the concluding six months of the prestigious Alexander von Humboldt Foundation Senior Fellowship. And third, he plans to spend his retirement years in the Boston area, where he wants to buy a house close to his daughter and her family. To understand the change, remember that **Jason** will be new to home ownership, preferring for his many years at Princeton to rent within walking distance of Guyot Hall and the Computing Center.

Born October 10, 1935, in Savannah, GA, **Jason** received a B. S. in Physics in 1957 from the Georgia Institute of Technology, and a Princeton Ph.D. in Physics in 1964. From 1964 until his appointment in 1967 as assistant professor on the Geology faculty, he was a research associate in geophysics in the department. In 1982 he was elected to the National Academy of Sciences and in 1988 he was named Knox Taylor Professor of Geography at Princeton. Somewhere along this line

of progress **Jason** married Carolyn Goldschmidt, known to all as Cary, and they had two children, Jason Phipps and Michèle Elizabeth, and five grandchildren. Sadly and unexpectedly, Cary succumbed to acute leukemia in 1991.

During his tenure in the department **Morgan** has taught a wide range of courses: History of Ocean Basins, Introduction to Geophysics, Structural Geology, Earthquakes, Volcanoes and other Hazards, as well as the Freshman Seminar at Mammoth, CA, and a number of seminars in his area of expertise. Over the years **Jason** has been much honored. He has received the following medals and awards: 1972 Walter H. Bucher Award (AGU); 1983 Alfred Wegener Medal (European Union of Geosciences); 1984 New York Academy of Sciences Award in Physical and Mathematical Sciences; 1986 Leo Lutaud Prize (French Academy of Sciences); 1987 Maurice Ewing Award (AGU and U. S. Navy); 1990 Japan Prize (Science and Technology Foundation of Japan); 1994 Wollaston Medal (Geological Society of London); 1997 Honorary Doctor of Science (Harvard University); 2000 Vetlesen Prize (Columbia University), and 2002 National Medal of Science, awarded November 2003.

John McPhee wrote several passages about **Jason Morgan** in his Pulitzer Prize winning book, *Annals of the Former World*. He has generously allowed us to include these elsewhere in this issue. 🌐



Karin Sigloch

Graduate student Ben Phillips and Jason Morgan *64 on a field trip to British Columbia.

Passages about W. Jason Morgan From “Annals of the Former World”

By John McPhee (Farrar, Straus & Giroux, 1998)

Morgan can fairly be described as an office geologist who spends his working year indoors, and he is a figure of first importance in the history of the science. In 1968, at the age of thirty-two, he published one of the last of the primal papers that, taken together, constituted the plate-tectonics revolution. **Morgan** had been trained as a physicist, and his Ph.D. thesis was an application of celestial mechanics in a search for fluctuations in the gravitational constant. Only as a post-doctoral fellow was he drawn into geology, and assigned to deal with data on gravity anomalies in the Puerto Rico Trench. Fortunately, he was assigned as well an office that he shared for two years with **Fred Vine**, the young English geologist who, with his Cambridge colleague Drummond Matthews, had discovered the bilateral symmetry of the spreading ocean floor. This insight was fundamental to the revolutionary theory then developing, and sharing that office with **Fred Vine** drew **Morgan** into the subject — as he puts it — “with a bang.” A paper written by H.W. Menard caused him to begin musing on his own about great faults and fracture zones, and how they might relate to theorems on the geometry of spheres. No one had any idea how the world’s great faults — like, say, the San Andreas and the Queen Charlotte faults — might relate to one another in a system, let alone how the system might figure in a much larger story. **Morgan** looked up the work of field geologists to learn the orientations of great faults, and found remarkable consistencies across thousands of miles. He tested them — and ocean rises and trenches as well — against the laws of geometry for the motions of rigid segments of a sphere. At the 1967 meeting of the American Geophysical Union, he was scheduled to deliver a paper on the Puerto Rico Trench. When the day came, he got up and said he was not going to deal with that topic. Instead, reading the paper he called “Rises, Trenches, Great Faults, and Crustal Blocks,” he revealed to the geological profession the existence of plate tectonics. What he was saying was compressed in his title. He was saying that the plates are rigid — that they do not internally deform — and he was identifying rises, trenches, and great faults as the three kinds of plate boundaries. Subsequently, he worked out plate motions: the variations of direction and speed that have resulted in exceptional scenery. It was about a decade later when **Morgan**’s Princeton colleague **Ken Deffeyes** asked him what he could possibly do as an encore, and **Morgan** — who is shy and speaks softly in accents that faintly echo his youth in Savannah, Georgia — answered with a shrug and a smile, “I don’t know. Prove it wrong, I guess.”

Instead, he developed an interest in hot spots and the thermal plumes that are thought to connect their obscure roots in the mantle with their surface manifestations — a theory that would harvest many of the questions raised or bypassed by plate-tectonics, and similarly collect in one story numerous disparate phenomena.

In 1937, an oceanographic vessel called Great Meteor, using a newly invented depth finder, discovered under the North Atlantic a massif that stood seventeen thousand feet above the neighboring abyssal plains. It was fifteen hundred miles west of Casablanca. No one in those days could begin to guess at the origins of such a thing. They could only describe it, and name it Great Meteor Seamount. Today, **Jason Morgan**, with other hotspot theorists, is not only prepared to suggest its general origin but to indicate what part of the world has lain above it at any point in time across two hundred million years. Roughly that long ago, they place Great Meteor under the district of Keewaytin, in the Northwest Territories of Canada, about halfway between Port Radium and Repulse Bay. That the present Great Meteor Seamount was created by a hot spot seems evident from the size and configuration of its base, which is about eight hundred kilometres wide and closely matches the domal base of Hawaii and numerous other hot spots. If a submarine swell is of that size, there is not much else it can be. That it was once, theoretically, somewhere between Port Radium and Repulse Bay is a matter of tracing and dating small circles on the sphere traversed by moving plates.

When Great Meteor arrived at the edge of the Canadian Shield, under the present site of Montreal, it presumably made the Montereian hills, for one of which the city is named. The Montereian hills are volcanic, but their potassium-argon age disagrees by twenty million years with the date when, by all other calculations, Montreal was over the hot spot — an exception that probes the theory. **Morgan** attributes the inconsistency to “random things you can’t explain” and mentions the possibility of faulty dating. He also says, quite equably, “If the Montereian hills really don’t fit the model, you have to come up with another model.”

The hotspot hypothesis was put forward in the early nineteen-sixties by **J. Tuzo Wilson**, of the University of Toronto, as a consequence of a stopover in Hawaii and one look at the islands. The situation seemed obvious. James Hutton, on whose eighteenth-century “Theory of the Earth” the science of geology has been built, understood in a general way that great heat from deep sources stirs the actions of the earth (“There has been exerted an extreme degree of heat below the strata formed at the bottom of the sea”), but no one to this day knows exactly how it works. Heat rising from hot spots apparently lubricates the asthenosphere — the layer on which the plates slide. According to theory, the plates would stop moving if the hot spots were not there. Why the hot spots are there in the first place is

a question that seeks its own Hutton. For the moment, all **Jason Morgan** can offer is another shrug and smile. “I don’t know,” he says. “It must have something to do with the way heat gets out of the lower mantle.”

An event of the brevity and magnitude of a great basalt flood is an obvious shock to the surface world. “We don’t know what flood basalts do to the atmosphere,” **Morgan** remarked one day in 1985, showing me a chronology he had been making of the great flood basalts that not only filled every valley “like water” and killed every creature in areas as large as a million square kilometres but also may have spread around the world lethal effects through the sky. **Morgan’s** time chart of flood basalts matched almost exactly the cycles of death that are currently prominent in the dialogue of mass-extinction theorists, including the flood basalts of the Deccan Plateau, which are contemporaneous with the death of the dinosaurs — the event that is known as the Cretaceous Extinction. 🌐

Field Trip to British Columbia



Karin Sigloch

Students overlook the Douglas Channel fjord.

Last May **Lincoln Hollister**, Faculty, led a field trip to the Prince Rupert area of British Columbia. The group included: Faculty members, **Hollister**, **Jason Morgan** *64, **Bob Phinney** and **Peter Bunge**; graduate students, **Karin Sigloch** and **Ben Phillips**, undergraduates, **Dalia Bach** ‘04, **Sarah Brownlee** ‘03, **Maia Schweizer** ‘04, **Ale Hakala** ‘03, and **Naomi Levine** ‘03.



Karin Sigloch

A group photo of some of the field trip participants.



Karin Sigloch

Students and faculty on outcrop.

Additions to the party included **Glenn Woodsworth** *74, **Laurel Goodell**, Staff, and Princeton physician **Roger Moseley**. **Hollister** has had a research project in this area for over 30 years, and this was a chance for his students, friends, and colleagues to observe a major cross-section of the Coast Mountains along the Skeena River fjord. The metamorphic history suggests that the mountains must have been as high as the Himalaya 85 million years ago. 🌐

Books

Causes and consequences of globally warm climates in the Early Paleogene, edited by S. L. Wing, **Philip D. Gingerich** ‘68, B. Schmitz, and E. Thomas, 2003, Geological Society of America, Special Paper 369, 588 p., \$95.00, member price \$76.00

State of knowledge of the globally warm early Paleogene, physical and chemical causes of climate change, effect of climate change on marine and terrestrial biota, stratigraphic framework of the Paleogene.

Geology of a transpressional orogen developed during ridge-trench interaction along the North Pacific margin, edited by **Virginia B. Sisson** *85, S. M. Roeske, and T. L. Pavlis, 2003, Geological Society of America, Special Paper 371, 353 p., \$90.00, member price \$72.00

A best preserved ancient example of ridge-trench interaction is exemplified by the Tertiary evolution of the North American Cordillera from Kodiak Island, Alaska, to Vancouver Island, British Columbia. This volume includes an overview of geologic expression of ridge subduction and the separate papers cover a wide range of themes. 🌐

Paleotempestology?



Figure 1: Terry McCloskey '03 at the microscope in the paleontology laboratory.

You won't find our title in the *Glossary of Geology*, but it's a perfect term for the thesis research by Terry McCloskey '03 (Figure 1). Returning to Princeton in 2000 as a sophomore, he decided to major in the geosciences after 27 years away. But more of that later. His study is based in the western Caribbean, which required not only perseverance in getting all the equipment to Belize - very difficult due to restrictions resulting from 9/11 - but a lot of self-taught engineering as well as hard work. His goal was to come up with a 500-year sedimentary record of hurricane strikes on the coast of Belize. Paleotempestology = Study of ancient storms.

During his junior year McCloskey did two papers on background for the subject and in taking a series of 26 cores about three meters deep along the central and southern coast of Belize to select the best area for his detailed senior thesis research. With cores in hand, he selected one good core and identified storm-generated layers, basically sand layers, within the carbonaceous silt layers of the marsh-deposited sequence. Assuming constant sediment rates for one core, he matched the sand layers to the historical record back to 1790 and got an excellent match. This made a detailed study promising. For this junior paper, he was selected as a co-recipient of the department's 2002 Benjamin F. Howell '13 Junior Independent Work Prize.

McCloskey settled on the area near the village of Gales Point as the optimal site for the more in-depth senior thesis study. That summer he took additional three meter cores in two areas: Gales Point and a few miles away near the Mullins River. These cores in each area were taken on two transects running perpendicular to the ocean about 75 meters apart with cores every 10 meters or so running from about 60 meters inland to around 110 meters inland.

These cores were examined both visually and using loss-on-ignition—weigh, burn, again weigh - in order to determine the carbon content. A low burn ratio indicates a sand/silt layer—a

storm generated layer. He produced the stratigraphic sequence for these cores in order to correlate them over distance in an attempt to identify individual events across the cores (Figure 2). Samples for Carbon 14 dating were sent off in order to identify the events historically. Those results showed a 5000-year record of storm strikes, with the more recent storms stratigraphically matched with historical events.

The most interesting finding was an extremely large event dated to latest Pre-Columbian times. By all methods of measuring relative magnitudes, this storm greatly surpassed that of any of the others in the sediment record, including Hurricane Hattie, which made landfall at the study site in 1961. Hattie was one of the defining moments in modern Belize history, since the resulting devastation was so extensive that the British moved the country's capital from its traditional coastal location, Belize City, to a site bulldozed from the jungle in the center of the country.

Evidence for the apparent temporal clustering of hurricane strikes into alternating active and quiet periods of several hundred years duration was also found. Depending upon the Carbon 14 results he is working to see if it is possible to extend the historical record. The main point is to determine a longer data base and try to identify long-term trends as opposed to irrelevant fluctuations. There is also a question about a proposed 1000-year cycle (oscillation) of hurricane frequency on the Gulf of Mexico as opposed to U. S. Atlantic Coast, and the general relationship between hurricane frequency in the Caribbean and other parts of the North Atlantic basin.

His faculty advisors, Gerta Keller and Jason Morgan '64, thought McCloskey would be able to produce the 500-year record he was seeking. Actually, when he got the radiocarbon dates back, it's a 5000-year record. Ten times as good as he was hoping for.

The oldest member of the Class of 2003

McCloskey graduated from Princeton as the oldest member of his class at age 49. Originally in the Class of 1976, he left Princeton after his sophomore year with a wanderlust. This took him to Germany, France, Italy and Crete working his way as a migrant worker, picking grapes, farm construction, olive oil processing, and on to northern Africa, Sudan, Ethiopia and Tanzania. In 1976 he returned to the U. S. and after picking cherries, apples, and pears in the Pacific northwest, moved on to Belize. He tended land for an American farmer, who eventually supplied him with seeds, equipment and land. After a while he was able to buy a tract of land near St. Margaret's village, on which he cleared 40 acres of dense brush himself. After 20 years his 65-acre farm was a success producing corn, pineapples, beans, livestock and more. He married the niece of one of the village men, and has two sons, now 11 and 8.

How did he make it back to Princeton? He saw a reference in the *Princeton Alumni Weekly* to a trip of some Princeton undergraduates on the Princeton Project in International Community Service and suggested they move the trip to a natural park

The Morganfest

Jason Morgan's contributions to science were lauded in a conference at Princeton, October 10-11, 2003, titled, *Plates and Plumes- A Celebration of the Contributions of W. Jason Morgan to the Ongoing Revolution in Earth Dynamics*. Over 130 people registered and many more attended the conference and associated festivities. These included a surprise birthday party for Jason on October 10 orchestrated by Lincoln Hollister, Faculty, and Ken Deffeyes *59; as well as a banquet in the new Genomics Center on October 11, spiced up by personal reminiscences by Larry Cathles *71, Naomi Levine '03, Bob Phinney, Faculty, Greg Van der Vink *83 who was master of ceremonies, and family remembrances by his daughter, Michéle. All in all the conference was a fitting tribute to a man with an extraordinary and still-active career in science.

Fourteen talks and 30 poster papers were given by a group of distinguished scientists. Sessions were chaired by several of his former students: Christine Powell, *76; John Chen *89; Richard Hey *75; and Ann Tréhu '75. Papers were read by Jason Phipps Morgan, GEOMAR, Kiel, Germany, *A retrospective on the scientific contributions of W. Jason Morgan*; Xavier Le Pichon, Géologie, Ecole Normal Supérieure, Paris, *Asymmetry in elastic properties and the evolution of large faults*; Claude J. Allégre, Institut de Physique du Globe, Paris, *The chemical composition of the Earth*; Kurt Feigl, Centre National de Recherche Scientifique, Toulouse, *Trade-offs between tropospheric artifacts and deformation signals in microwave geodetic measurements, or how W. Jason Morgan helped youngsters in the GPS and SAR business avoid another "Palmdale Soufflé"*; Thomas S. James *91, Geological Survey of Canada, Sidney, British Columbia, *Space geodesy, absolute gravimetry, and crustal deformation*; Henry J. Dick, Woods Hole Oceanographic Institution, Woods Hole, MA, *Ultra-slow spreading: a new class of ocean ridge*; Donald W. Forsyth, Brown University, Providence, RI, *Intraplate volcanic ridges, seamount chains and the early evolution of the Pacific lithosphere*; Richard M. Allen *00, University of Wisconsin, Madison, *Mantle structure and flow beneath the Iceland hotspot*; Dan P. McKenzie, Bullard Laboratories, Cambridge, UK, *The thermal and chemical structure of plumes*; Albrecht W. Hofmann, Max-Planck-Institut für Chemie, Mainz, Germany, *Anatomy of the Hawaiian plume*; Paul R. Renne, Research Staff 1987-89, Berkeley Geochronology Center, University of California, Berkeley, *Mantle plumes, flood basalts, and mass extinctions*; Christopher L. Andronico *99, University of Texas at El Paso, TX, *A North American arc perspective on the making of continents*; Christopher Beaumont, Dalhousie University, Halifax, Nova Scotia, *Crustal channel flows: an explanation for Himalayan-Tibetan tectonics?*; Paul E. Tapponnier, Institut de Physique du Globe, Paris, *Continental collision: hidden plate tectonics*; Guust Nolet, Faculty, *Jason Morgan was right after all: deep mantle plumes exist*.

Pictures from The Morganfest are in the centerfold of this issue of *The Smilodon*.



Figure 2: One of the split cores. The pointer is on the upper of two sand layers that are storm-generated. The yellow circles indicate the contacts between the sand and carbonaceous layers in this marsh sequence.

near St. Margaret's. Following this contact and since he and his wife felt the need to return to the U. S. for schooling for the boys, one of whom needed special attention, he decided he would try to finish his Princeton degree as well. McCloskey's brother, Douglas '78, contacted the university and the university was very receptive to the idea.

On return he decided to major in Geosciences. Last June he received his A. B. in Geosciences and two certificates, one from the Woodrow Wilson School Program, and the other from the Environmental Studies Program. The Department awarded him Highest Honors and the Edward Sampson '14 Prize, and from the Environmental Studies Program, he received the Peter W. Stroh '51 Environmental Thesis Prize.

It has been a lot of hard work for Terry and his family. He worked part time on various jobs and his wife perfected her English and worked in the Rockefeller College kitchen. All this would not have been possible if it were not for the generous support from Princeton and a Udall Scholarship, funded by Congress.

McCloskey has entered a Ph.D. program at Louisiana State University, one of the centers of storm research. By coring lake beds, and thus eliminating erosion difficulties, he hopes to establish a strike record with a level of resolution fine enough to permit the correlation of individual hurricane events with archeologically-documented stresses in Mayan cultural history. 🌐

Scenes from Morganfest!



Morganfest photos taken by Eva Groves, staff, and graduate students Ben Phillips and Karin Sigloch.



Honors

On October 22, 2003, the President named eight elite scientists and engineers to receive the 2002 National Medals of Science. **W. Jason Morgan**, faculty, was one of them. The citation reads, “**Morgan** is credited with explaining two profound concepts—plate tectonics and mantle plumes—the essential underpinnings of modern seismology, volcanology and mantle geochemistry. Development of plate tectonics has revolutionized the geophysical study of the Earth and its history.”

Joseph Smagorinsky, former director of the Geophysical Fluid Dynamics Laboratory (GFDL) and member of the AOS faculty, was the co-recipient of the 2003 Benjamin Franklin Medal in Earth Science of the Franklin Institute. He and Norman A. Phillips, National Weather Service and MIT, shared the award for their major pioneering contributions to the prediction of weather and climate using numerical methods.

Isaac Held, Faculty AOS, and head of NOAA’s Climate Dynamics Group was elected as a member of the National Academy of Sciences.

Elected to the American Association of Arts and Sciences are **George Philander**, Faculty, and **Joe L. Kirschvink** *79, CalTech.

The American Geophysical Union (AGU) has selected as Fellows: **Michael A. Arthur** *79, Penn State, for his pioneering discoveries regarding the evolution of oceans and atmosphere and their influence on life; **Joseph L. Kirschvink** *79, CalTech, for contributions to many diverse fields in paleomagnetism, geodynamics, and geobiology; and **Jorge L. Sarmiento**, Faculty, for contributions to the study of the global carbon cycle through the use of general circulation models.

In June the department recognized the following graduate student teaching assistants with an Arnold Guyot Graduate Teaching Award: **Adam Baig**, Silver Award; **Bryan Mignone** and **Ben Phillips**, Bronze Awards. Each received a monetary prize and certificate.

A Proctor Fellowship has been awarded to graduate student, **Alexandre Marc Fournier**. 🌐

Degrees and Awards

Through Graduation, June 3, 2003

Ph.D

Sigal Abramovitch *02, *Paleoecology and Paleoenvironment of Maastrichtian Planktic Foraminifera: Examples from Low and Middle Latitude Localities*

Karen Lynn Casciotti *02, *Molecular and Stable Isotopic Characterization of Enzymes Involved in Nitrification and Nitrifier-Denitrification*

Giulio Boccaletti *03, AOS, *The thermal structure of the upper ocean*

Brian Justin Mailloux *03, *The Role of Aquifer and Microbial Heterogeneity on the Transport and Activity of Bacteria in the Columbia Aquifer, Oyster, Virginia*

MA

Angela N. Knapp

Di Li, AOS

Benjamin Ross Phillips

AB/BSE

Andrew Martin Batchelor

Sarah Jo Brownlee

Matthew Warren Cromwell

Daniel Jeffrey Fuller +

Jacqueline Alexandra Hakala +

Andrew Whitney Jarrett

Naomi Marcil Levine +++*†

Terrence Allen McCloskey ++

Payan Andrews Ole-MoiYoi

Thomas Joseph Pray

Meryl Liebowitz Raymar ++

+++ Highest Honors

++ High Honors

+ Honors

* *Society of Sigma Xi*

† *Phi Beta Kappa Society*

Environmental Studies Certificate

Jacqueline Alexandra Hakala

Terrence Allen McCloskey

Meryl Liebowitz Raymar

Woodrow Wilson School Certificate

Terrence Allen McCloskey

PRIZES

Arthur E. Buddington Award

Naomi Marcil Levine

Sheldon Judson '40 - William Bonini '48 Teaching Award

Naomi Marcil Levine

Edward Sampson '14 Prize in Environmental Geosciences

Terrence Allen McCloskey

Chairman's Prize

Meryl Liebowitz Raymar

Benjamin F. Howell '13 Junior Prize

Maia K. Schweizer '04

Society of Sigma Xi Book Award

Jacqueline Alexandra Hakala

News

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Send news to: <smilodon@geo.princeton.edu>

Degrees: 'undergraduate, *graduate

Ray Stotler '39 sent us several geology field guidebooks for the Library. One was from a 1937 Tectonics Field Conference on the Bighorn Basin — Yellowstone Valley, co-organized by the YBRA, Red Lodge. He was one of several geology majors who attended this field trip in his junior year summer. It was a very interesting time for them, since so many attendees were famous geologists. Several of the volumes are now in the departmental library with duplicates going to the Red Lodge camp library. <raystot@earthlink.net>

Bob Christman *50 will be succeeded by **Ian MacGregor *64** as Executive Director of the National Association of Geoscience Teachers in November. Bob is still busy as editor/registrar for the Washington Science Teachers Association. <xman@cc.wvu.edu>

Jim Murray *64 is Senior Advisor to WestLink Innovation Network, a company owned by the Western Canadian universities and research centers in Calgary, Alberta. <jim.murray@westlink.ca>

As noted by **John DeYoung '67**, a section of the web page at UC Berkeley on Plate Tectonics reads, "...with it came many observation (sic) that led scientists like Howard (sic) Hess .." John's comment: "Howard Hess?!! ...there's so much correcting to be done on the material posted on the Internet that one feels like trying to bail out the Atlantic Ocean with a thimble."

Did you notice the article in the May 14, 2003, *Princeton Alumni Weekly*, on page 49: "Science fiction or science? **Mike Archer '67** attempts to clone extinct Tasmanian tiger."

Following his retirement from the University of Manitoba, **Lorne Ayres *69** is moving to Courtenay, Vancouver Island, British Columbia. That move is temporary until their home is built in Tofino, located at the north end of the Pacific Rim National Park and at the west end of the Trans-Canada highway. Colleagues are welcome to visit. Great beaches, storm waves, and whale watching. <ayres@Ms.UManitoba.CA>

In 1998 **Bob Duncan '71** became Rohm Professor of Marine Science Education and is now responsible for overseeing all undergraduate education at the College of Oceanic and Atmospheric Sciences, Oregon State University, Corvallis. In addition he was co-chief scientist on Ocean Drilling Project's Leg 197 to the Emperor Seamounts to test paleomagnetically whether the Hawaiian hotspot has remained stationary throughout its history (it hasn't). Recently he has worked on dating of lunar impact glasses returned by Apollo 16, and discovering hydrothermal fingerprints for ocean plateau volcanism as causes of ocean anoxic events (black shales) in Cretaceous time. <rduncan@coas.oregonstate.edu>

David Converse '77 writes that even after 20 years with ExxonMobil he still operates at the interface between engineer-

ing and geoscience. Unfortunately that combination of skills remains unusual. He serves as a division technical coordinator with the ExxonMobil's Upstream Company with one task to integrate geoscience and engineering research as applied to reservoir characterization and management.

<drconverse@houston.it.com>

Mark Logsdon '72 wrote to express appreciation for the fine tribute to **Rob Hargraves *59** in the last issue. He and **Zeke Zavodni '64**, whom he works with at Kennecott, indicated the response is shared among the alumni. He particularly liked the cover picture, down to the khaki gear, hand on hip, and the every present smile. <mark.logsdon@sbcglobal.net>

Donna Jurdy, research associate 1975-1980, is delighted to be completing a term as department chair at Northwestern University. She reports that they have just hired **Suzan van der Lee *96** as a new assistant professor. <donna@earth.northwestern.edu>

After working for a decade at the Lunar and Planetary Institute in Houston, **Lew Ashwall *79** moved in 1990 to South Africa - first as professor at Rand Afrikaans University and since 2002 at the University of the Witwatersrand, both in Johannesburg. He has been involved in many projects, including geology and tectonics of Madagascar and other Indian Ocean islands and in the state of Rajasthan in NW India. He has continued work on meteorites and anorthosites. Latest work includes a project in northernmost Norway and the petrology and geochemistry of a fascinating kimberlite that crosscuts through the center of the Bushveld Complex.

<ashwall@geosciences.wits.ac.za>

Phil Hogan '80 has been with Dames & Moore/USR since 1995. In 2000 he and family moved to Perth, Australia, worked on a BP offshore geohazard project 100 km north of Bali, Indonesia. Returning in 2001, he is now Senior Marine Geologist, URS Corporation in Santa Barbara, CA. Life is pretty good, aside from the daily stress imposed in the consulting world. <phillip_hogan@urscorp.com>

Eric Yollick '83 wrote that **Rob Hargraves *59** was a terrific scholar and teacher, he brought enthusiasm and zest for life that infected everyone around him. <eric Yollick@swbell.net>

Steve Heussner '84 is now at Heussner Insurance Agency, Inc., in Dallas, TX.

Harriet Papastergiou Pearson '85 has relocated to Ridgefield, CT after 12 years in Washington, DC. She just celebrated 10 years with IBM and is now Vice President, Workforce and Chief Privacy Officer, at corporate headquarters. She is thinking of leading a local hike and using it as an excuse to study up on the local geology. <hpearson@us.ibm.com>

From the *Princeton Alumni Weekly* we note that **Peter Burck '85** is a hydrologist in the New Mexico office of the state engineer, hydrology bureau, in Santa Fe, working on a ground-water flow model for the Taos area.

Mark Gleason '88 and family are enjoying the benefits of living in a small college town. After almost nine years in environmental and civil engineering consulting with GeoSyntec

Consultants, most recently in Boston, he opted for a less stressful career. He is now Project Manager, Facilities Planning, Middlebury College, Middlebury VT. <mgleason@middlebury.edu>

Stopping by Guyot **Terrance Barr** *90 reports he has been working for the last three years for AFEX International, a petroleum exploration company based in Houston. He has been focusing on exploration mostly in West Africa. <tdbarr@afexintl.com>

Lisa Koenig '91 is living in Monterey, CA, with spouse and recent baby, and is working part-time for Risk Management Solutions, doing seismic hazard analysis projects for the earthquake engineering group. <koenig@asu.edu>

Moving to the University of Wyoming, Laramie, with husband and new baby, **Jennifer Bonini** '91, finds Laramie an interesting small town. <bonini@northlink.com>

Harvey Cohen *92 wrote to get an address for **Misty Tingler-Sato** '90. We found out his title - it's senior project geologist with A. A. Papadopoulos and Associate in Bethesda, MD. <hcohen@sspa.com>

Leaving Stanford University, **Goetz Bokelmann** *92 has taken a position at the University of Montpellier in Southern France as professor of geodynamics. <Goetz.Bokelmann@dstu.univ-montpz.fr>

Judson Jacobs '93 is enjoying working at Cambridge Energy Research Associates in Boston in their global oil group, concentrating on the impact of technology on exploration and production activities. He stays in close touch with **Dan Shea** '93, **Todd Henderson** '93 and **Betsy Mason** '93. <jjacobs@cera.com>

Living in Caracas, **Brian Groody** '96 is manager for Venezuela and Trinidad for the wireline logging division of Schlumberger Oilfield Services. Going through the national strike he says not only was there no gasoline, there was no beer. Luckily VZ is one of the largest consumers of scotch in the world and there was plenty on hand. <groody1@slb.com>

A card on the birth of a son last November from **Enrique Novoa** *97 and **Pulchérie Gueneau** *97 with addresses in Venezuela and France.

Val Zimmer '98 called asking about potential graduate schools. After almost two years with Schlumberger, she has been in the "rock group" at Applied Research Associates in South Royalton, VT. Some of her work relates to determining rock properties with an instrumented drill. <vlzimmer@alumni.princeton.edu>

Having completed his Ph.D. in geophysics at Cornell, **Bill Langin** '99 now works in New Orleans with Shell Exploration and Production. His thesis title was "Seismicity, Tectonics, and Lithospheric Structure of the Tibetan Plateau." <wrlangin@hotmail.com>

Heather Hibbert '99 reports that she is currently living in Albuquerque getting her M. S. in Earth and Planetary Science at the University of New Mexico. She's not sure where the job market will take her. <hhibbert@alumni.Princeton.edu>

Kate Fleegeer '99 reports that she has recently returned from a six and a half month "cruise" aboard the USS Boxer in the U. S. Marine Corps.

"Our squadron, HMH-465, spent most of the time in the Northern Arabian Gulf, but did manage to get some time on land. We spent a little over a month in central Iraq transporting troops and supplies in our CH-53E Super Stallion helicopters. I was able to meet a number of Iraqi children and young adults and it was interesting to speak with them and learn a little bit about their lifestyle.

"While in the gulf, I was also promoted to the rank of Captain, but the most exciting thing that happened to me was getting shot down just north of the city of Najaf (which you may recognize as the site of some recent bombings). We took a bullet to one of our engines and proceeded to catch on fire. We made an emergency landing, but before we could get on the ground, we lost control and flipped over. All four of us that were on board escaped with only a few bruises and scrapes, but the aircraft burned to the ground. The other helicopter that was flying with us landed and picked us up to take us back to base. It was definitely an experience I will never forget!

"Now that we are back in the San Diego area, we are working hard to get ready for our next deployment. We will be leaving mid-December for a seven-month stint in Okinawa, Japan. While in Okinawa we'll be supporting operations in the Philippines, Korea and who knows where else?

"I was unable to make it to reunions this year, but will hopefully be able to fly back from Japan for a week to make it for my 5th reunion. I look forward to stopping by the Geo department to see what's new. My new address in California is 17161 Alva Rd. #932, San Diego, CA 92127. My mail will be forwarded to me once I'm in Japan. Hope to see you at reunions!" <kfleegeer@juno.com>

T. J. Pray '03 is teaching eighth-grade science in the public school in Randleman, NC. He is very excited about the opportunity to affect the 180 students in his classes. His curriculum includes an important segment in geosciences.

Class of 2003 whereabouts: **Andy Batchelor**, public affairs assistant, U. S. Environmental Protection Agency, DC; **Sarah Jo Brownlee**, graduate student, Columbia University; **Matthew Cromwell**, assistant, environmental law firm, DC; **Daniel Fuller**, Morgan Stanley, investments; **Jacqueline Hakala**, graduate student, Ohio State University; **Andrew Jarrett**, associate geologist, Chesapeake Energy, Oklahoma City; **Naomi Levine**, research, Princeton 55 Fellow; **Terrence McCloskey**, graduate student, Louisiana State University; **Payan ole-MoiYoi**, unknown; **Thomas Pray**, teacher, Randleman, NC; **Meryl Raymar**, public lands associate, The Wilderness Society, DC.

Whereabouts of Recent Ph.Ds: **Karen Casciotti** *02 is with the U. S. Geological Survey in Reston, Va.; **Sigal Abramovitch** *02

is staying at Princeton; **Giulio Boccaletti** *03 is at the Massachusetts Institute of Technology; **Brian Mailloux** *03 is with Columbia University, New York; **Sergio Speziale** *03 is a postdoc in the Department of Earth and Planetary Science at the University of California, Berkeley; with time off for the birth of Adrian, **Sara Carena** *03 and spouse **Hans-Peter Bunge**, Faculty 1998-2003, are in Munich, Germany.

A large group came back for the Reunions Reception, May 30, 2003. Those signing in are here listed, and if a message was left look above: **Chris Acker** '98; **Sarah Albano** '98; **Peter Carney** '53; **Dana Dreibelbis** '78; **Ben Farrow** '98; **Randi Hedberg** *83; **Matt Hoehler** '98; **Kevin Kuechler** '88; **Bill Langin** '99; **Andrew LeCuyer** '98; **Kate Miller** '82; **Jamie Peterson** '93; **Eryn Robinson** '98; **David Sawitzki** '88; **Brent Silver** '98; **Steve Stanley** '63; **Frank Williams** '78; **Val Zimmer** '98. 🌐

Around The Department

Did you see the colorful picture of **Bess Ward**, Faculty, gracing the cover of the April 23, 2003 issue of the *Princeton Alumni Weekly*? The article inside details her research in Antarctica.

New Graduate Students and where they're coming from: **Peter John DiFiore**, North Carolina State University; **Gabrielle Boissier Dreyfus**, Harvard University; **Wei Gao**, JiLin University, Changchun, China; **Laura Frances Harrington**, Duke University; **Paul Evan McGee**, University of British Columbia; **Patrick Schultz**, University of Stuttgart; **Yi Huang** AOS, Peking University, Beijing, China; **Agnieszka Smith-Mrowiec** AOS, University of Warsaw; **Neven Stjepan Fuckar** AOS, Texas A & M University.

New postdocs: Working with **Tom Duffy**, Faculty, are: **Duanwei He** from Los Alamos National Lab, working on the elastic properties of superhard solids and hydrous minerals, and **Atsushi Kubo** from Gakushuin University, Japan, working on mineralogy of the deep mantle using the laser-heated diamond anvil cell. Following her PhD defense here, **Raffaella Montelli** *03 will continue as a postdoc with faculty, **Guust Nolet** and **Tony Dahlen**, imaging plumes using their new tomographic method. Joining **Satish Myneni**, Faculty, as a postdoc is **Ashish Deshmukh** from Ohio State University working on the coordination chemistry of organohalogens associated with organic macromolecules in the environment. **Galen McKinley**, from MIT is an AOS postdoc at Princeton with faculty **Michael Bender** and **Jorge Sarmiento** as well as at the University of Wisconsin, Madison, studying ocean models of air-sea flux of carbon dioxide in the ocean carbon cycle.

Degui Tang, University of Wisconsin, Madison, joins the research staff, working on trace metal-algae interaction with **François Morel**, Faculty.

Hans-Peter Bunge, Faculty 1998-2003, is now professor at the Ludwig Maximilians University, Munich. <bunge@imu.de>

Peggy Cross, editor of *The Smilodon* for over 25 years, moved last spring to a retirement community near her son, a professor at Yale University. She says she would like to hear from any and all. Evergreen Woods #315, 88 Notch Hill Rd., North Branford, CT 06471, 203-483-7649.

Alumni/ae and Faculty Departmental Lectures: In May, **Tim Herbert** *87, Brown University, lectured on *Polar Signals dominating the equatorial Pacific surface water 1.2-2 MA*. In April, **Tony Dahlen**, Faculty, spoke on *Bananas, doughnuts, seismic traveltimes, and deep mantle plumes*; and **Jacqueline Hakala** '03 talked on *Natural organohalogens: using x-ray absorption spectroscopy to identify organobromines in the environment*. In October, **Alan Smith** *63, University of Cambridge, England, lectured on *Reconstruction, gateways, and glaciations*. Also for October see Morganfest listing. 🌐

Deaths

John Coulter Bierer *38
May 16, 2002

William Francis Bohner '49
March 13, 2003

William Alfred Braddock *59
January 1, 2003

John Randolph Bland Disbrow '33
December 2, 2002

Ronald Frank Gebhardt *66
January 15, 2003

Van Santvood Merle-Smith, Jr. '40
June 1, 2003

William Harlowe Miller '31
December 31, 2002

Benjamin Beagary Morgan '57
August 1, 2002

Stephen Francis Percival, Jr. *72
May 22, 2003

Frank Norton Spencer, Jr. '33
April 18, 2003

Richard Dowling Thomson '38
November 1, 2001

Donald Edward White *39
November 20, 2002

From The Archives...



Arthur F. Buddington *16, Faculty, 1920-1959, left, at the 80th birthday dinner in 1938 for William Berryman Scott '77, Faculty, 1880-1930.

Arthur F. Buddington *16, Faculty, 1920-1959, with his wife, Jene Muntz Buddington, in 1967. On that occasion his portrait by the artist, Furman J. Finck, was presented to the Department. The painting was placed in the stairwell in Guyot Hall with other faculty paintings. In 2000 it and the other portraits were removed for safe keeping by the Art Museum during construction in the old Museum area.



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Our Department is always pleased to hear
from our Alumni/ae and Friends.

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