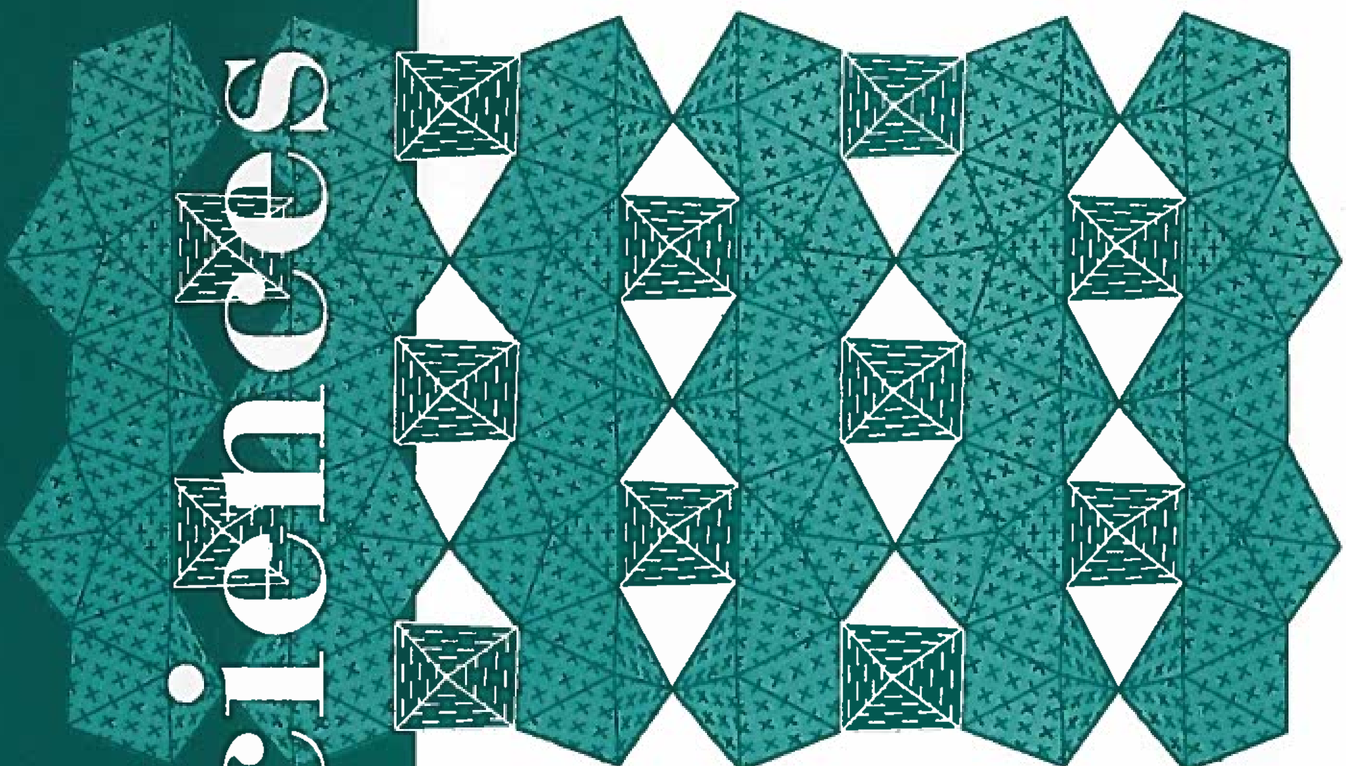
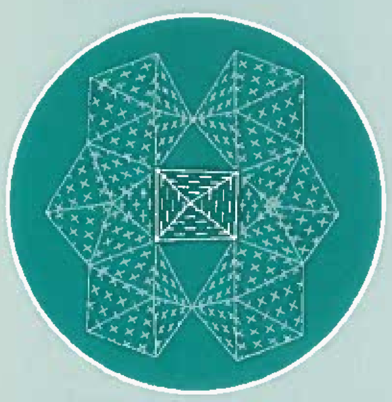
GeoSciences

University of Illinois
at Urbana-Champaign



Department of Geology
Alumni Newsletter
Spring 1997



About Our Cover:

The structure of ianthinite, a uranium mineral that is likely to form when spent nuclear fuel is placed in a geological repository. Ianthinite is likely to collect plutonium, possibly preventing it from being released into the environment.

GeoSciences

Department of Geology Alumni Newsletter Spring 1997

GeoSciences is the alumni newsletter for the Department of Geology, University of Illinois at Urbana-Champaign. It is published in the fall and spring of each year.

Staff Department Head: R. James Kirkpatrick; Assistant to the Head: Peter A. Michalove; Editor: Deborah Aronson; Production: LAS Office of Publications; Administrative Secretary: Terri George.

From the Department Head

Dear Friends,

It is with considerably mixed feelings that I write this last letter to you. I will be stepping down as department head on August 20 of this year, and although I am very much looking forward to devoting full time to teaching and research, there are many aspects of being head that I will miss. Interacting closely with alumni will certainly be one of them. During the last nine years it has been my pleasure to make new friendships and renew old ones with many of you. Every time I meet with alumni I am reminded of the great success of the department in the past and am encouraged to continue to work hard to insure similar success in the future. I have also been greatly heartened by the loyalty you have shown through support of the GeoThrust program. I will certainly continue to keep in touch.

We do not yet know who the new head will be, but I can say there are several excellent candidates and I am fully confident that the department will be in good hands. Because of the need for cooperative responsibility among the faculty, I am a strong believer that university departments do best with relatively frequent changes in leadership. Looking back, I feel very good about the remarkable progress in the department's educational and research programs over the past nine years and about our strong position as we face the future. Indeed, there are several important announcements.

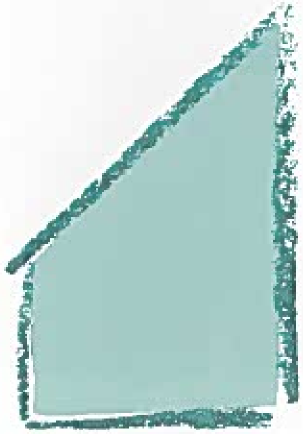
The Midwest Alumni Undergraduate Scholarship endowment has reached its goal with $100,000 in pledges, although additional contributions are still very welcome and will allow us to help even more students. The efforts in Oklahoma/Kansas and the Rocky Mountain states headed by Les Clutter and Norb Cygan to develop endowment to support student field work are also going well. In addition, although the endowment for the Texas/Louisiana graduate fellowship will not be complete for two more years, it has reached the point where we will offer a partial fellowship for the coming year.

We also are pleased to announce that Tom Johnson has joined the faculty as assistant professor. Tom has a strong background in isotope geochemistry and uses isotopic data to understand reactive transport in groundwater systems. Tom will solidify our already strong position in hydrogeology. We are also in the middle of a search for a faculty member in sedimentary geology. There are several outstanding candidates, and we are on our way to rebuilding Illinois as one of the leading places in this field.

Profiles of Peter Burns and Erick Bestland, both of whom joined us last fall as visiting assistant professors, are included in this issue of GeoSciences.

Sincerely,

GeoNews



Midwest GeoThrust Meets Its Goal

The Midwest project launched September 21 to support undergraduate research has met its goal. The project organized alumni in 10 states in the Midwest to fund scholarships for undergraduate research projects. The fund will provide resources for students working on individual research projects with faculty. The $100,000 goal has been met and approximately five percent of the endowment earnings will be used each year to support two undergraduate projects.

The co-chairs of the Midwest committee are Morris "Brud" W. Leighton (B.S.'47) and Haydn H. Murray (B.S.'48, M.S.'50 and Ph.D.'51). Leighton is a retired chief of the Illinois State Geological Society and chair of the Geology Department's GeoThrust committee. Murray is professor emeritus at Indiana University.

Honorary co-chairs for the committee are Park Livingston (B.S.'30) and Jack Simon (A.B.'41, M.S.'46). Livingston served 10 years on the University of Illinois Board of Trustees, and is president emeritus of the board. Simon is a retired chief of the Illinois State Geological Society and the first recipient of the Geology Department's Alumni Achievement Award.

Two other projects to support field trips and summer field camp, both important parts of geology training, also have been undertaken. Kansas and Oklahoma alumni are working under the leadership of Lester W. Clutter (B.S.'48, M.S.'51) to support field trip costs. Norbert Cygan (B.S.'54, M.S.'56, PhD.'62) is working with alumni in the Rocky Mountain states to support costs of summer field camp. Those projects were both begun this fall.

Jim Kirkpatrick Steps Down As Geology Department Head

Jim Kirkpatrick will step down as head of the geology department, effective August 20 of this year. Kirkpatrick has been head for nine years, since 1988, and has served ably in this position. During his tenure the department experienced an eight-fold increase in the number of non-geology majors taking introductory courses for their physical sciences requirement. Kirkpatrick's tenure also has seen renewed contact and communication with alumni.

"As an alumnus myself, I have greatly enjoyed the opportunity to reacquaint myself with fellow classmates and to meet so many of the alumni," said Kirkpatrick.

Kirkpatrick is stepping down to devote more time to his research, which involves the use of lasers on minerals to understand their geochemical, mineralogical and petrological characteristics. His current interests include structural phase transition in minerals, the mechanisms of water/rock and water/clay interaction, glass structure, order/disorder in minerals and the structure of high-pressure minerals, as well as reaction mechanisms in reaction-bonded ceramics. Kirkpatrick has written more than 150 research articles and has been a councilor of the Mineralogical Society of America, vice president of the International Mineralogical Association (IMA) Commission on Crystal Growth, secretary of the IMA Commission on Mineral Physics, and an Overseas Fellow of Churchill College, Cambridge.

Richard Hay To Retire In May

Richard Hay, the Ralph E. Grim Professor of Geology, is retiring this May. Hay joined the Department of Geology faculty in 1983 and was the first person to hold the Grim professorship. Ralph Grim, the University of Illinois geologist who established the chair, was one of the founders of the clay mineralogy field.

"Ralph Grim had established this department as a center of clay mineral research, and moving here gave me the opportunity to further my research in clay mineralogy," says Hay. "With Steve Altaner on the faculty, it continues to be a real center of this kind of research, just as when Ralph was here."

Hay is best known for his work at Olduvai Gorge where he worked out the stratigraphy and helped in dating of fossil remains and archaeological sites for Louis and Mary Leakey. He was resident geologist at Olduvai from 1962 until 1974, and in 1976 he published his synthesis, "Geology of the Olduvai Gorge: A Study of Sedimentation in a Semiarid Basin." He received the Kirk Bryan Award from the Geological Society of America for this monograph and the Arnold Guyot Award from the National Geographic Society for his geological research in East Africa.

Since coming to the University of Illinois, Hay has followed two lines of research. One line, continued from work at the University of California at Berkeley, was the clay mineralogy of muds in saline lakes of the closed basins of arid and semiarid regions. Most of these muds consist largely of clay minerals formed in the saline lakes and include illite, smectite, kerolite, sepiolite and various mixed-layer species. So far he has studied the clay mineralogy of lake basins in the Amargosa Desert of Nevada and California, the Searles Lake region of California and the Amboseli Basin of Kenya and Tanzania. Many graduate students at the University of Illinois have assisted in the clay mineral studies, which shed new light on factors responsible for neoformation of the different clay minerals.

The other line of research, begun with aid from Dennis Kolata of the I.S.G.S., is of the age and origin of K-feldspar and illite formed in uppermost Precambrian and lower Paleozoic rocks of the mid-continent. Thanks to the research of Hay and graduate students Mike Duffin, Jay Matthews and Junzhe Liu, we now have a much clearer picture of the distribution, age and origin of the K-feldspar and illite in the Mississippi Valley area.

The Midwest scholarship project to support undergraduate research was launched September 21. Organizers of the project were (above, from left) honorary co-chairs Jack Simon and Park Livingston and Midwest committee co-chairs Haydn Murray and Morris Leighton. Jim Kirkpatrick (left), Patricia Santagrossi and Jack Threet were on hand to kick off the project.

MEMORIES . . .

On May 9 the department will hold a retirement dinner for Hay. In preparation, the geology department is seeking letters of congratulations and reminiscences from Hay's colleagues and students, which will be put in a book to present to him at the dinner. Please pass this request on to other classmates and colleagues who may have a message they'd like to present to Hay. All letters should be sent by April 23 to: Terri George, Staff Secretary, University of Illinois Department of Geology, 245 Natural History Building, 1301 W. Green St., Urbana, Ill. 61801.

Tom Johnson Joins Department Faculty

The Geology Department welcomes its newest faculty member, Tom Johnson, who arrived in January as assistant professor.

"The department has been very welcoming and that has made the transition from California a lot easier for me, as well as for my wife, Zanne Newman, and our sons, Lucas, who's one, and Charlie, who's two," says Johnson. "Some department members even helped us take Lucas and Charlie out sledding and to the Chicago aquarium, which was just great."

Johnson is a hydrogeologist and concentrates on application of chemical measurements in studies of ground water flow and solute transport. Most of his current research involves isotope ratios such as $^{87}Sr/^{86}Sr$, that are very useful as tracers of ground water movement and chemical reaction of water with rock.

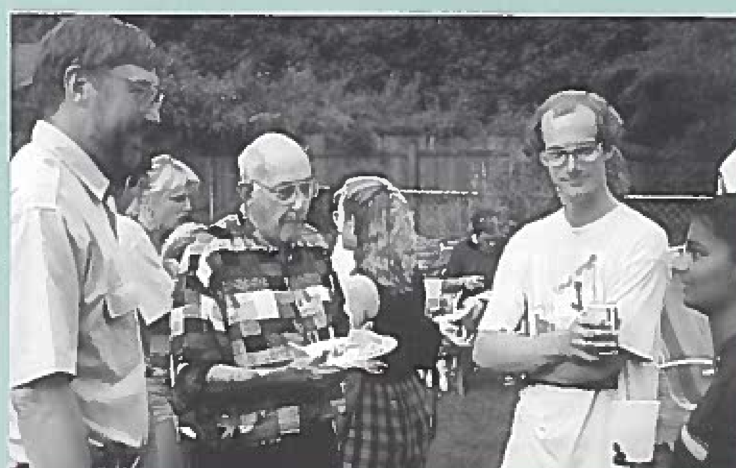
This spring Johnson is teaching a seminar that takes an in-depth look at isotope measurements in hydrogeology. Next fall he will teach an introductory hydrogeology course.

Johnson is enthusiastic as he sets down roots at the U. of I. "One of the things that made this position so appealing to me is that we are in a phase of hiring new faculty," says Johnson. " I think everyone is excited to add new people with new ideas and energy to complement the existing strengths of the department."

Check Us Out!

http://www.geology.uiuc.edu/

with links to:
Illinois State Geological Survey
Illinois State Water Survey
Environmental Council
NCSA



(At left) K. O. Emery receives the outstanding Alumni Achievement Award from Jim Kirkpatrick at the banquet held in his honor on September 6. After the banquet, an informal picnic was held at the house of Professor Stephen Marshak. On hand were (above, from left) Jim Kirkpatrick, K. O. Emery, Peter Burns and Maitri Venkataramani.

Alumna Suzanne Mahlburg Kay And Extinct Volcanoes: A Magmatic Attraction

Suzanne Kay (in front) with colleagues next to a salt lake in the Altiplano Plateau of the Chilian Andes. Kay's colleagues are, from left, Chilean geologist C. Mpodozis, Cornell student L. Greene and Argentine geologist B. Coira.

Suzanne Mahlburg Kay (B.S. '69, M.S. '72) examines how the chemistry of volcanic and plutonic rocks are influenced by their tectonic setting. By understanding the geochemistry, geologists like Kay can reconstruct the tectonic processes that formed the magma.

Kay's study of magmatic rock has taken her from the Aleutian islands to the Andes. She has shown that magmas are very closely related to the setting in which they formed and, conversely, that by analyzing the specific magma composition, scientists can understand the tectonic activity that took place within the Earth.

"We've been looking at how the various characteristics of the lava's chemistry are related to where that volcano sits," says Kay. "This is quite different from studies that focus on the internal magmatic processes within the volcano, and don't consider the fact that this volcano is in the Aleutians or in Japan or in the Andes."

Birth of Plate Tectonics

Kay completed her Ph.D. in 1975 at Brown University under Dick Yund (B.S.'56, Ph.D.'60). While at Brown, her interests in mineralogy continued and she branched out into plate tectonics—which was just getting off the ground—kinetics, and chemistry.

"I was in graduate school right around the time when plate tectonics started to break, and it was exciting," says Kay. "The people just leaving graduate school were really making the discoveries, and we rode on their coattails."

Another exciting event in graduate school for Kay was meeting and marrying her husband, Robert Kay, who is a geochemist. They first met at an American Geophysical Union meeting, though Kay knew him through his work prior to that. Although the Kays are currently working on different projects, the two have published about two dozen papers together.

Kay has been at the Institute for the Study of the Continents at Cornell University since 1976. She also is an associate professor in the Department of Geological Sciences. Her husband also is a professor in the department.

Aleutian Arc

Kay's early work focused on the Aleutian arc, a chain of extinct volcanoes that are arrayed in a series of straight segments with breaks in between them. She found that those in the center have a distinct chemistry from those at the ends of the segments. The chemical composition fell in two categories: calc-alkaline and tholeiitic. She and her colleagues showed that the tholeiitic volcanoes sit at the end of the volcanic segments while those at the center are calc-alkaline.

"If you had gone to one of the ends and said 'this is a typical Aleutian volcano' as opposed to one in the center, you'd have gotten a very different story." says Kay.

Although there are various theories for the differences in chemical composition, Kay suggests that the reason is tectonic: the segment ends were subject to different stresses than the center of the segment.

On to the Andes

After studying the Aleutian arc, which is an example of oceanic crust subducting with oceanic crust, Kay became interested in the Andes, where ocean crust subducted under continental crust. Although there is an area in the Aleutians that provides that setting, she says it was logistically very difficult to access. At the same time, some of her Cornell colleagues had been in the Andes, which is, after all, renowned for its magmatism. It seemed like a logical step for Kay to move there for a parallel study to the Aleutians.

One of the most significant elements of the project, Kay notes, was the high degree of cooperation with Chilean and Argentine colleagues, which continues to the present.

"Victor Ramos, who is clearly a preeminent geologist in South America, has been a big influence in many of the projects that I've done," says Kay.

In March, she returned from a month-long trip to the high Andes, where she worked with both Chilean and Argentinian geologists, including Contantino Mpodozis and Betty Coira.

Much of Kay's work in the Andes is geochemical, including trace element and major element analyses and isotopic analyses. She has found evidence that magmas are influenced by the angle at which the plate subducts, which differs along the Andes. The angle, she hypothesizes, affects where the melting is taking place and what is melting. By analyzing this information, Kay can not only understand what is happening along the Andes, deep beneath the crust, but also, perhaps apply that knowledge to a place like the Himalayas, where two continental crusts have collided and neither has subducted.

Another project Kay worked on with Ramos is in Patagonia, where there are extensive basalts, volcanic rocks which are more common in oceans than on continents. This project grew out of a Fulbright fellowship Kay received in 1989.

"Victor had worked in the region for 10 years, so he had a lot of the background figured out," says Kay. "We went down and tried decipher what was going on with them. That has evolved into several other projects, as well."

For example, one of her students is studying the basalts in the southernmost region of Patagonia, east of the Chile triple junction, where the Chile rise (an ocean ridge) collides with the Chile trench.

Illinois-Accented Spanish

With all her work in South America, Kay has learned Spanish. "That has been a big thing for all the people from Cornell," she says. "As Victor pointed out, if we were going to work down there, it was our obligation to learn and speak Spanish."

Kay has mastered the language well enough to give several short courses in the modern concepts of petrology and geochemistry, as well as talks at the last four Argentine Congresses, all in Spanish.

"I have spent a month in the field without speaking English at all, so I'm pretty fluent," says Kay. "Though others do tease me that I speak with an Illinois accent."

The Argentine Geological Association has acknowledged Kay's contributions to the field, by making her an honorary member. This is a major recognition for foreign geologists who have worked in Argentina. In addition, Kay is the first woman ever to receive the award, as well as the first native-born American.

"This award really means a lot to me, and it meant a lot to the Geological Association," says Kay.

As a young person, Kay always was interested in the natural world. Her father directed the natural history museum in Rockford, IL, and while growing up, Kay remembers being very interested in birds. In fact, she intended to become an ornithologist when she first came to the University, but her early zoology classes were filled, she found, with people who didn't share her interests, and she became disenchanted. Searching for other pursuits, Kay joining the caving society and went caving in Indiana. Through this activity she met some geology graduate students who encouraged her to take a geology class. One course was all it took for her to change her major.

"Hilt Johnson taught that class," Kay remembers. "He was a very good teacher and got people interested. Second semester I remember I took historical geology, which had an honors lab associated with it that I was very impressed with. That's where I met a lot of people who later became my undergraduate classmates."

Kay says a big benefit to her of being a geologist is learning about countries "from an inside view."

"One of the big attractions of geology to me is being able to go to places like the Andes and the Aleutians," says Kay. "I've probably seen more of the Andes from an inside view than almost any other American, at least that I know. That's because I've gone with Argentine and Chilean geologists to very remote places that you wouldn't go to as a tourist."

Alumna Sharon Mosher: A Dynamic System

Even though the Earth looks pretty stable to the average inhabitant, from Sharon Mosher's perspective, it is a dynamic system, with rocks and structures providing clues to what happened millions of years ago.

Mosher (B.S.'73, Ph.D.'78) is the Wilton Scott Centennial Professor of structural geology at the University of Texas at Austin. She focuses on reconstructing geologic events related to past plate tectonic movement in order to understand similar processes today.

The Illinois-born Mosher has conducted research in the Precambian uplifts of central and west Texas, in west-central Arizona's Maria tectonic belt, the northern Apennines of Italy, and in the Narragansett Basin of Rhode Island. Much of her work involves studying the processes that cause deformation and quantifying its effects from a microscopic to mountain-range scale.

"I am especially interested in how mountain ranges are formed," she says. "There are different ways that you can get mountain belts. Some of them are due to collisions, either continent-to-continent or 'volcanic island arc'-to-continent. In other cases, no collision is involved. When you go back far enough into the past, it isn't always clear what has happened, because along the length of the mountain belt or at different depths, different processes are happening at the same time. Yet they are all related to the same plate interactions. It is like a gigantic jigsaw puzzle with many of the pieces missing. I've always enjoyed solving puzzles, the more complicated the better. "

Mosher is a dynamic system herself. She conducts research in several areas, actively mentors dozens of students and serves on numerous university and professional committees. She also parents her two daughters, nine-year-old Lisa and 13-year-old Sarah, with her husband and fellow geologist, Mark Helper (B.S.'78).

"I have a reputation for getting things done," says Mosher, with some understatement.

Structural geologists like Mosher must reconstruct geologic events by combining field data on rock types and structures, such as folds, faults and planar fabrics, and laboratory data on the geochemistry of the rocks, the temperature and pressure conditions of deformation and metamorphism, and the absolute ages of the rocks and metamorphic events. These clues help Mosher determine what the rocks originally were (volcanic islands, continental shelf/slope sediments, etc.), and how they were deformed. This information, in turn, helps her reconstruct ancient plate tectonic movement.

Texas' Llano Uplift

Much of Mosher's recent work focuses on the Llano Uplift region of central Texas, a 9,000-square-kilometer area that contains rocks ranging in age from 1.0 to 1.3 billion years old. She and her colleagues and students have found evidence that an island arc collided with the ancient North American continent about one billion years ago.

"One of the things we have determined is that an island arc which formed somewhere else collided with what we think was North America at that time," says Mosher. "We also are finding evidence for a continent-continent collision.

"We found igneous rocks that had the right petrology, isotopes and chemistry to be an island arc," says Mosher. "Their isotopes and geochemistry are very different from all the rest of North America. When you cross the boundary between these rocks and what we think were marginal continental shelf/slope sediments, you see an abrupt difference in the type of rocks, the geochemistry and the isotopes. The rocks at that boundary are the most deformed rocks in the entire Llano area."

All of this data gives Mosher a greater understanding of how this margin of North America may have evolved with time. Central Texas is an ideal laboratory for Mosher's work because this event has not been "overprinted" by subsequent geological events. In addition, there's been so much erosion, Mosher estimates that most of the rocks she's been looking at were probably 40 to 50 kilometers below the surface at one point. By having access to these ancient rocks, she can look at the processes that took place, and are presumably taking place today at similarly deep crustal levels.

"Working in Llano has been very exciting and educational." says Mosher. "When I first started working in the area I concentrated on the structure. No one had previously recognized the complexity of the deformation, but with the training I had from Dennis Wood, I was well prepared to unravel it. I didn't find out until much later that I picked the most complicated place to start! Since then I have tried to understand the tectonic setting that caused the deformation of the area, and this has forced me to learn new fields."

Mosher is presently on a Dean's Fellowship research leave to continue her research in central Texas.

The Maria Belt

Another region of interest to Mosher is the Maria tectonic belt of west-central Arizona, which formed in the Jurassic and Cretaceous periods (165 to 80 million years ago). Usually, mountain ranges in the western Cordillera trend north-south parallel to the coast. However, in the region of southeastern California and western Arizona, the structures make a right-angle bend and trend east-west. This region is known as the Maria belt.

Mosher and her students have been looking at the processes of deformation that took place within the belt, and it appears that the same rocks in different mountain ranges have responded to deformation in very different ways. In some mountain ranges the rocks form large-scale (several kilometers in amplitude) recumbent folds that have then been folded again one or more times. In other mountain ranges, instead of folding, ductile faults have formed where the rock in narrow zones have flowed instead of breaking.

Mosher is now working on the question of why the structures and rock behavior are so different. The answer to that puzzle, Mosher suspects, has to do with fluids.

"I originally started working here to test a conclusion from an earlier study of the Portoro limestone in northern Italy, near La Spezia. One of my students was able to show that fluids clearly flowed along the zones that underwent translation. This migration of fluids along channels within the rock caused strain softening and allowed ductile deformation at much lower temperatures than expected. Where fluids were not present,

Mosher travels to the ends the Earth to check on students in the field.

brittle faulting occurred," Mosher explains. "Using the microscope, you can see how minerals making up the rock deform. If fluids were present, the minerals would deform the same way they would if they were deformed at higher temperatures. We were getting rocks deforming in ways they shouldn't have at the existing temperatures, so we expected fluids might be present. Using geochemistry and stable isotopes, we were able to document the presence of fluids."

A colleague suggested that the Maria belt would be a great place to test this finding in different rock types. This process-oriented work led Mosher to a new area, where she became fascinated by the structural problems and has proceeded to work on the tectonic evolution of the area.

"I always try to have two large projects in different places going at one time, because I find that what I learn in one area helps me understand problems in the other," says Mosher. "I also usually have students working in many different areas, and some of them turn up exciting new places for major research projects. Other times, though, they answer interesting questions, and sometimes, provide adventures."

Mosher says that her most exciting trip to "field check" a student required her to cross the Andes of Tierra del Fuego on horseback and live off the land, which she described as "a trip of a lifetime."

For one of her earliest research projects, Mosher studied rocks in the Rhode Island's Narragansett Basin area. Mosher and her students were the first to prove that the Pennsylvanian-aged rocks (about 290 million years old) and surrounding basement in the region were multiply deformed and metamorphosed and had been affected by an orogeny, the process of mountain building. Based on the age of the rocks, it had to be the Alleghenian orogeny, which occurred when Africa collided with North America, subsequently forming the Appalachians.

Previous to Mosher and her students' work, scientists believed that the Alleghenian orogeny did not affect New England. Since then, other geologists have worked further west in the basement and have shown that the effects of the Alleghenian orogeny are widespread in New England.

A Rock in Her Hand

Mosher knew all her life she wanted to be a geologist. "My mother likes to say I was born with a rock in my hand," she says.

Mosher's parents were extremely supportive, though neither had a science background. Her father took her on many Illinois Geological Survey field trips as she was growing up, and she filled the basement with bushel baskets of rocks picked up on family vacations. Mosher says starting in fifth grade she entered geology projects in science fairs and remembers her father setting up a Bunsen burner and chemistry lab for her in the basement a year or so later.

"I taught myself chemistry in junior high using borrowed college texts, and I tried to apply what I learned to rocks," says Mosher.

Mosher's fascination with geology continued through high school and college. After receiving high honors and departmental distinction at the University of Illinois as an undergraduate, she continued her studies at Brown University with Jan Tullis, where she was one of the first to document the importance of pressure solution as a deformation mechanism. She received her master's degree in 1975, after which Mosher returned to the University of Illinois to conduct her dissertation research with Dennis Wood. Both her master's and doctoral degrees were based on research she conducted on pressure solution deformation of the Purgatory Conglomerate of Rhode Island.

Immediately upon completing her Ph.D., Mosher was hired by the University of Texas at Austin, where she has been ever since. Over the years she has won several awards for teaching and for her many contributions to the department.

Mosher published her first paper several years before she received her doctorate and hasn't slowed down yet. To date, she has written almost two dozen articles, a book and numerous guidebooks. Her work is widely respected, and she continues to receive numerous honors and recognition, including the Association of Women Geologists Outstanding Educator Award, which she received in 1990. She was only the second recipient of this national honor.

> I've always enjoyed solving puzzles, the more complicated the better.

Mosher also has been very active in the Geological Society of America (GSA). She was a founding member and the first elected chair of the GSA division of Structural Geology and Tectonics, a mere two years after completing her dissertation. This was a great honor, especially for someone so young. This division drew numerous structural geologists who previously hadn't had a professional organization, and it rapidly grew to be the largest division within GSA.

Dedicated Teacher and Mentor

Mosher also enjoys conveying her love of geology to students.

"I find the undergraduate students here very interested in geology, whether they're majors or non-majors," says Mosher. "I especially like teaching field geology. For 15 years I've been director of our six-week-long field camp, which is based in Montana. You're out in the field with the students every day and you teach them how to map and interpret the geology and structure they see in the field. That's really fun because that, to me, is what geology is all about."

Over the course of her 18 years as a professor, Mosher has supervised an unusually high number of students: a dozen doctoral students and almost two dozen master's degree students.

"I am a very active mentor to my students," says Mosher. "I try to bring out the best in each of them and to produce independent, thinking scientists. I also recognize that, being somewhat unusual, I am a role model for women and men. I represent a woman who is successful in geology, plays an active role in her family and still has a normal life."

In addition to undergraduates and graduate students, Mosher visits her two children's schools and talks to classes about rocks and volcanoes, caves, plate tectonics and other geological topics.

"I like to teach young children for two reasons. First of all, young children, even into middle school, are really interested in how the Earth works and in science. This needs to be encouraged. We all need to understand the Earth because it affects our lives on a daily basis."

"The second reason I like to go to my children's schools is because I believe it is important for kids to see women scientists. While my kids and their friends see that as normal, not all children do."

Erick Bestland: Reconstructing Ancient Climates

Wisconsin-reared Erick Bestland has always felt very connected to the landscape around him. His original interest in geology grew from his curiosity as a child about mountains.

"We traveled a lot when I was younger. And I always wondered why Wisconsin didn't have any mountains," Bestland remembers. "We'd go out west and drive across the Great Plains for a thousand miles and then boom! there are the mountains. 'Why are they right there?,' I'd ask myself."

Bestland, who is a visiting assistant professor in the department, doesn't study mountains, but he does study fossil soils to understand ancient climate change. His research may help answer questions of how the climate will change in the future.

Climate Dictates Vegetation

"Climate, which includes temperature and precipitation, dictates vegetation types—so, for example, the natural vegetation here in Illinois is different from Floridian vegetation," says Bestland. "Climate and vegetation together make a soil different as well. In certain strata of layered rocks there are fossil soils, so if you can identify the fossil soil type you can get an idea of what kind of climate and vegetation existed."

Erick Bestland (right) and friends at the Pasalar fossil ape site in Turkey.

Bestland explains that by studying hundreds of fossil soil horizons that represent millions of years of soil formation under a variety of climate and vegetation regimes, paleo-soil scientists can determine how the climate changed over time. These soils are now exposed in rocky outcrops called badlands.

Bestland first began studying such badlands in east Africa, where he conducted his dissertation research. Lately he also has been working in Oregon, which he has shown used to be a jungle. The climate was humid and hot, with temperatures averaging in the 80s and 90s. There is extensive fossil evidence of rhinos, tapirs and crocodiles. The climate then became more temperate, with severe swings of temperature, and cold seasons included below-freezing temperatures for some months.

The geological evidence shows that the climate changed in three major steps. Those steps occurred about 42, 34 and 30 million years ago. The most dramatic one was at 34 million years ago and was caused, according to others' research, by ocean circulation and tectonic plate movement. This same plate movement caused other dramatic climate changes, too. For example, it caused Antarctica to become thermally isolated on the South Pole, says Bestland. Prior to this, Antarctica was connected to Australia and had no ice. As Australia pulled away, the oceanic and atmospheric currents cooled Antarctica to its present state.

Future Expeditions

Bestland is in the midst of planning both another east Africa expedition and research in Oregon. This time he is looking for data about the earliest grasslands at both locations. This information will help him understand the conditions for another major climatological change that scientists theorize occurred somewhere between 15 and 20 million years ago.

"Grasses thrive in cooler climates than other kinds of vegetation, so they evolved fairly late in the whole scheme of things," says Bestland. "Evidence of early grasslands, such as a very fine soil structure with lots of organic matter, will give us information about when exactly the climate cooled enough to allow grasses. Hopefully we'll also be able to gather data about how grasslands expanded with time. My theory is that the climate was swinging back and forth at quite a high amplitude between wetter and drier conditions. Dry periods of time allow for grasslands, whereas wetter periods would encourage forest growth."

In east Africa, Bestland's grasslands research also may tie in to hominid evolution. There is a theory that the evolution of grasslands and open spaces may have contributed to the evolution of the bipedal gait in hominids. While 15 million years ago is well before the appearance of hominids, it is possible that grasslands did set the stage for other evolutionary change, says Bestland.

Bestland's research may help answer questions of how the climate will change in the future as well. For example, scientists are trying to determine how the Earth's climate will respond as humans increase the CO_2 content of the atmosphere by burning fossil fuels and increase the dust in the air with pollution.

"We have this natural experiment going on for millions of years as the planet has been here and the climate has changed," says Bestland. "Within this geologic record you can pretty much find whatever climate change you're looking for. It's an old earth-science maxim that the present is the key to the past, but you can also turn that around a little and say that understanding the past may be the key to understanding the future."

Teaching: A Creative Endeavor

In addition to his research, Bestland is teaching two classes, sedimentology/stratigraphy for juniors and basin analysis for graduate students. Last fall semester he taught two introductory courses, Earth and environment, and introductory geology for honors program students.

"I like teaching," says Bestland. "It's a creative endeavor to broaden young people's minds. It's great, too, when the subject sparks the imaginations of students who haven't thought about the fact that the Earth changes all the time."

"The discipline of geology has changed quite a bit over the last 10 or 15 years," Bestland notes. "It's better termed 'earth science' because we don't just look at rocks, and rocks being folded or crunched into mountains. We deal with the atmosphere and the ocean. It's more interdisciplinary and more integrated, so earth science is a more apt term. In my most recent paper, for example, I have references from oceanography, soil science and meteorology, as well as geology and paleontology. I like that because a lot of different people can read it."

It's better termed 'earth science' because we don't just look at rocks, and rocks being folded or crunched into mountains. We deal with the atmosphere and the ocean.

Bestland received his bachelor's degree in geology from the University of Wisconsin-Madison in 1982 and his Ph.D. from the University of Oregon in 1990.

"Being at the University of Illinois reminds me of my undergraduate days," says Bestland. "It's very similar here: a huge Big Ten school with midwestern kids and cornfields as far as the eye can see."

Bestland in the Field

Bestland's field work keeps him in touch with the landscape and the environment he enjoyed as a youngster.

"I have spent a lot of time by myself in Oregon. Completely, absolutely alone. Often a whole day goes by without my talking to anybody, so you develop a relationship with other things. The landscape...or coyotes. One time I was walking back after doing field work and there were coyote pups playing down in a gully, so I barked at them and they answered. You develop a connection to the landscape."

There were other times in Oregon when Bestland was teaching a field camp for geologists. It was here he met his fiancée, Evelyn Krull, a fellow geologist from Germany, who co-taught the camp with him. They are planning to marry this spring. Perhaps not surprisingly, the two share a passion for rock climbing, among other things.

Peter Burns: Looking Small And Thinking Big

While Peter Burns is often looking through a microscope, his mind is usually racing ahead to new applications for his findings. As a mineralogist, Burns "looks small" and "thinks big" as he probes the details of low-temperature minerals. His research in mineralogy will potentially lead to new technology critical for fields as diverse as medicine and environmental hazards, such as nuclear waste disposal.

Burns, visiting assistant professor in the department, received his undergraduate degree at the University of New Brunswick in 1988.

"I grew up in a rural community in New Brunswick and wasn't exposed to such 'exotic' subjects as geology until university," says Burns. "In an introductory geology class I had a really good professor who inspired me to major in geology. Then in my second year I started to work with Lowell Trembath, who was really influential in my focusing on mineralogy. Professor Trembath was a natural-born teacher and he got me into the lab where I worked with him on his research projects."

Burns recognized Trembath's dedication to teaching mineralogy by naming the first mineral he discovered "trembathite."

After his undergraduate studies, Burns went on for his master's degree at the University of Western Ontario and completed his doctorate at the University of Manitoba in 1994. He continued his mineralogical research at the University of Cambridge and moved from there to the University of New Mexico in Albuquerque where he worked on nuclear waste problems.

> "When studying a system like this and learning about these properties, we don't necessarily have a specific application in mind. Often, that comes later."

Considering he received his Ph.D. less than three years ago, Burns has had a busy career. He is first author on almost 40 papers and has received numerous awards and scholarships. Those awards include two from the University of Manitoba: the J.L. Lightcap Award for the Highest Standing in his Ph.D. program, and the Winthrop Spencer Gold Medal for Outstanding Achievement in Geological Sciences.

Burns makes time for hobbies, as well. He is an avid fly-fisher, having grown up next to the Miramichi River in New Brunswick. He and his wife, Tammy, travel extensively throughout North America and elsewhere and they both enjoy photography. Much of their travel and photography centers on Tammy's work as an archaeology student at the University of New Mexico.

In addition to his busy research load and multiple hobbies, Burns is teaching several courses. He says he is happy to have resumed teaching, having focused mainly on research in Cambridge and Albuquerque.

"I love interacting with students and providing them with useful information and ideas," says Burns. "In many cases our incoming students have very little exposure to science and, hopefully, by the time they leave, they have gained an appreciation of science and how it relates to the world around them."

Atomic-Scale Investigation

Burns specializes in mineralogy and crystallography, and finds fascination in mineral's atomic-scale structures that are only visible with electron microscopes and X-ray equipment. He is especially excited about a recent breakthrough in X-ray equipment that pushes the frontiers of mineralogy. The new X-ray detector contains a small computer chip similar to the one that is used to detect light in a video camera. Burns uses it to reveal the structures of uranium minerals that form when spent fuel or radioactive mine tailings pollute the environment.

'The new X-ray detectors introduced last year have helped tremendously in my studies of low-temperature minerals," says Burns. "Now, I can see the structures of the tiniest mineral crystals more clearly than ever before. This is really going to help in sorting out some of the biggest environmental problems."

Those environmental problems include the disposal of high-level nuclear waste. Currently the country has about 30,000 metric tons of high-level nuclear waste material in temporary storage. Before the fuel is placed in a nuclear reactor, it contains only uranium dioxide. When the fuel is burned in the reactor, some of the uranium becomes a transuranic element (such as neptunium and plutonium), while other atoms of uranium undergo fission (the splitting of the atom) to form elements such as iodine and strontium. In total, about five percent of the uranium in the nuclear fuel becomes either a transuranic or a fission product.

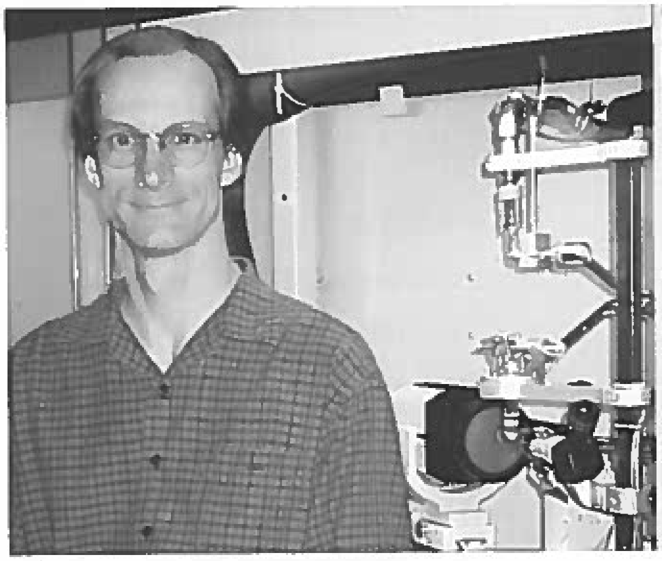
Many of these elements are highly radioactive for millions of years, so the waste is very difficult to dispose of safely. Because plutonium is highly radioactive and, studies show, can travel long distances in fluids that are always moving through rock, it is one of the most difficult to store or dispose of.

"The plan is to basically hollow out Yucca Mountain (near Las Vegas, Nev.), put the waste in, and close the door. Once this is done, it becomes a geological problem," says Burns. "Because Yucca Mountain is an oxidizing environment, you'll have the uranium dioxide of the spent nuclear fuel reacting and uranium minerals forming in place of it. This will cause swelling of the fuel rods, and they'll break apart and ultimately be destroyed.

"Most scientists start out assuming a massive release of radioactive material into the environment and then model the impact," says Burns. "Instead, I concentrate on the uranium dioxide of the spent fuel to see if the release rates of the radioactive material can be reduced."

To do this, Burns focuses much of his effort on the minerals that form in the alteration zones of uranium ore deposits, where uraninite, the mineral analog of the uranium dioxide in spent fuel, has interacted with the environment for millions of years. By studying the geological history of uranium ore deposits, and the uranyl (oxidized uranium) minerals that form due to weathering, Burns and his colleagues at the University of New Mexico have determined how uranium dioxide in spent fuel will behave under similar conditions. Burns thinks that the uranyl minerals that will form when the spent fuel is oxidized may be able to safely absorb much of the radioactive elements, such as plutonium, which is also in the spent fuel.

"We can't conclusively demonstrate yet that a specific uranyl mineral will take up the plutonium until we do the experiments, but our predictions are that it will at least slow down the rate of release into the environment," says Burns. "We have identified many uranyl minerals as critical to radioactive element release rates in an oxidizing environment, such as at Yucca Mountain."


Professor Peter Burns uses the new x-ray detector to help study low-temperature minerals.

Finds New Minerals

As it turns out, it's possible that information from one of Burns' other areas of research–borate minerals–might also help solve nuclear waste storage problems.

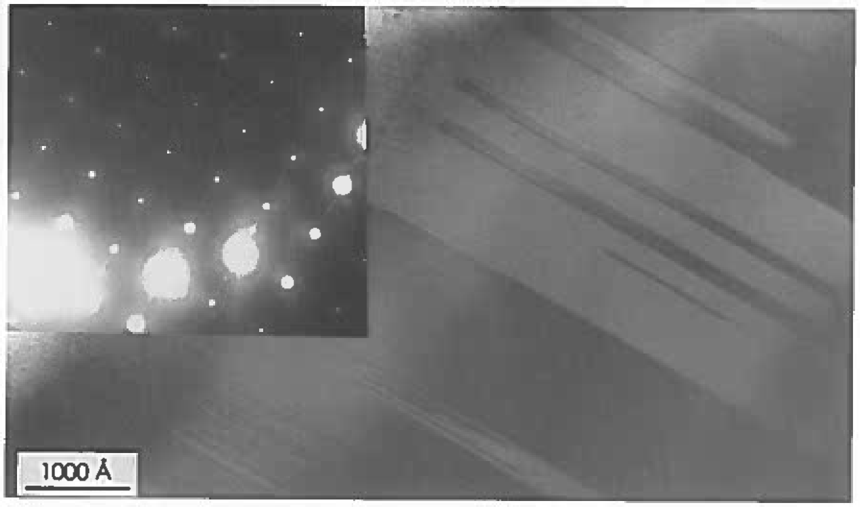
In 1987, as part of an undergraduate research project, Burns began studying a large deposit of borate minerals in New Brunswick, Canada. The borate minerals formed when boron-rich sedimentary rocks were heated. The borate minerals captured Burns' fascination, and maintain it today, because the atomic arrangements of these minerals are more complex and diverse than any other mineral group. They provide Burns with a unique opportunity to develop theories that relate a mineral's atomic arrangement with the geological environment that it grows in.

Detailed studies of the borate deposits led to the discovery of four previously unknown minerals. Burns discovered three of them—trembathite, pringleite and ruitenbergite.

"What's important," says Burns, "is that these borate deposits are structurally unique. This fits into my bigger picture of trying to relate crystal structures and variations in the structures with the geologic environment. This deposit is unique in the world."

Two of the three minerals Burns discovered are especially unusual because they have very large open structures with big cavities and channels that run right through the structures. Burns likens their structure to zeolites (aluminosilicates with similarly open structures), which have many industrial and high-tech applications such as oil refining, water softening and blood dialysis. These important discoveries were covered extensively in Canada, on national radio and television.

"The discovery of this new structure type was a highlight of my career to date," says Burns. "Zeolites have many applications because they are molecular sieves," explains Burns. "Certain molecules pass through the structures, but because the channels have specific sizes, larger molecules are prevented from passing. It's very important to be able to develop different structures with different size channels so you can fine-tune them to the specific use you have in mind."



Phase-transition-induced twins in boracite as revealed by transmission electron microscopy. The twins are due to the cubic-to-orthorhombic transition that occurs at about 310°C. The inset shows the electron diffraction pattern for the twinned area.

The zeolite-like borates may have applications in the disposal of plutonium contained in nuclear waste, or from atomic weapons that have been dismantled. It may be possible to place the plutonium in the large channels and cavities in the borate structure. This is desirable because plutonium is a very fissile element, meaning that it can spontaneously undergo a nuclear reaction, Burns explains. However, boron is a superb neutron poison, says Burns, so the borate structure will prevent such a reaction from occurring.

Borate minerals with this zeolite-type structure were unknown until Burns discovered these three new minerals. According to Burns, this discovery opens the door to a whole new area of technological applications. Before he could synthesize these materials and perform experiments with them, however, he first had to find out the conditions under which they form.

Burns found this information locked in crystals of boracite, another borate mineral from the same deposit, and used an electron microscope to reveal the thermal history of the borate deposit. This is possible because the boracite minerals have undergone solid-state phase transitions.

Burns' interest in solid-state phase transitions in minerals led him to the University of Cambridge after his doctoral studies, where he worked with the foremost research group in the area of mineralogy that concerns phase transitions. Phase transitions often occur when a mineral crystal cools and results in the appearance of twins, small portions of the mineral that are in a slightly different orientation from the rest. Phase transition-induced twinning is often only visible with the ultra-high resolution provided by a transmission electron microscope.

Twins are dependent upon the symmetry relations of high and low temperature phases, rather than on the specific mineral. So, as Burns explains, the presence of twins tells a lot about the temperature at which a mineral was formed. It's also possible to get very similar twins in different minerals. While Burns concentrates on phase transitions that occur in boracite minerals, what he learns about the phase transitions and the resulting microstructure can be useful for a larger range of minerals in different geological environments. Also, the microstructure in the boracite crystals provides information on the thermal history of the entire deposit, including the zeolite-type borates, thus providing the necessary information to begin attempting to synthesize this unique class of minerals.

Useful Applications

In addition, boracite materials have many properties associated with these phase transitions that can be used for technological advantage. Because the optical properties of the crystals vary continuously and systematically with temperature due to the phase transitions and structural variations, they are used in adjustable lasers.

"That's really important in, say, medical applications, such as laser surgery on eyes," says Burns. "You could also use them as optical memories, optical switches, and possibly in some sort of optical computer. When studying a system like this and learning about these properties, we don't necessarily have a specific application in mind. Often, that comes later."

Alumni News

Obituaries

Jackson Smallwood Young, B.S. '27, M.S. '29, died September 1, 1995, at the Glen Retirement Village in Shreveport, LA, at the age of 90. Young was born in Urbana, IL, in 1904 and was head geologist at United Gas for 35 years. He is survived by his wife of 65 years, Lelia (Tottie); a daughter; a son; five grandchildren and two great-granddaughters.

Kenneth Edward Clegg, B.S. '50, M.S. '53, died March 4 at the age of 85. Clegg was a veteran of World War II and served at the Headquarters Regiment of the U.S. Group Control Council in Berlin. He was awarded the Certificate of Merit when he was discharged in 1946. Clegg served as a geologist with the Illinois State Geological Survey until his retirement in 1973. He wrote several publications relating to coal and coal-bearing rocks in Illinois. Following his retirement, Clegg was a consultant and free-lance geologist until 1983. He was a member of the GSA, the American Association of Petroleum Geologists and the Illinois Mining Institute. Most recently, Clegg served on the local committee for the Department of Geology's Midwest Scholarship Endowment. He was active in the Boy Scouts and was an Eagle Scout. Memorial contributions can be made to the Boy Scouts of America, Prairielands Council, c/o Troop 10, Box 6267, Champaign, IL 61826.

Joann Scott died January 9, 1997. She was 89 and lived in Urbana. She is survived by her husband Harold W. Scott, A.B. '29, A.M. '31, recipient of the 1995 Geology Alumni Achievement Award, member of the department for 30 years, and former head of the Geology Department at Michigan State. Mrs. Scott also is survived by two sons, a daughter, nine grandchildren and ten great-grandchildren. Memorial contributions may be made to the Harold W. Scott Fellowship in Geology Fund in care of the University of Illinois Foundation, 1305 W. Green St., Urbana, IL, 61801.

Dorothy Smith, a long-time departmental secretary who retired in 1974, died December 15, 1996.

Alumni News is divided by decade. Those who were affiliated with the Department during part of one decade through to the next are listed according to the last degree received. Within each decade, items are listed in yearly sequence, not alphabetically.

Fifties

Barbara J. (Schenck) Collins, Ph.D. '55, writes that she is a professor of biology at California Lutheran University and teaches general biology, microbiology, and environmental ecology. "I particularly enjoy teaching a summer class of the 'Wildflowers of the Sierras.'" E-mail address: bcollins@robles callutheran.edu

Lawrence. T. Larson, B.S. '57, is a professor of economic geology at the MacKay School of Mines, University of Nevada at Reno. He was chair of the Department of Geological Sciences from 1975-1991 and will retire in June 1997. E-mail address: larson@mines.unr.edu

Stanley T. Bjurstrom, B.S. '58, is a lawyer with the St. Louis-based Thompson Coburn law firm. He specializes in intellectual property and health care law.

Lorence G. Collins, B.S. '53, M.S. '55, Ph.D. '59, retired from teaching at California State University, Northridge in 1993, but still works on the study of myrmekite. He visited Finland and Norway in June 1996 to look at some myrmekite-bearing granites. His web site (http://www. csun.edu/~vcgeo005) includes eight different presentations. E-mail address: 103725.3674@compuserve. com

Sixties

Valentine Zadnik, B.S. '57, M.S. '58, Ph.D. '60, recently left his job as contracts and grants officer in the Office of Energy and Marine Geology at the USGS to become chief financial officer in the Earthquake Hazards Program Office of the USAG. Zadnik plans to retire in a year or two and move back to his farm in Ohio. E-mail address: vzadnick@usgs.gov

Richard E. Smith, M.S. '60, retired last year from the U.S. Department of Energy after working as a geologist with the Strategic Petroleum Reserve (SPR) program, which he helped launch in 1975. Smith held many positions while he was with the SPR, including chief geologist, chief scientist, and director of the SPR Environmental Safety and Health Division. Prior to that, Smith had spent nine years at the U.S. Naval Research Laboratory. He received the Distinguished Service Career Award upon retirement. Smith lives with his wife in northern Virginia. They have two daughters and a grandson.

Jim Eades, Ph.D. '62, has acquired a large two-year research grant at the University of Florida.

Garnett "Guy" Dow, M.S. '62, Ph.D. '65, retired from Amoco after 28 years. Currently he is consulting for oil and gas companies. His most recent contract was with Energy Development Corporation.

Paul L. Plusquellec, M.S. '66, Ph.D. '68, is vice president of exploration and development with CNG Producing Co., part of Consolidated Natural Gas. He oversees all of CNG's exploration and development efforts. For seven years, Plusquellec also ran the operations department. Plusquellec writes, "After 28 years in the industry (Texaco 10 years, Natomas N.A. five years, CNG 13 years), I am retiring at age 55 on December 31, 1996. Plan to relax for awhile, then—maybe—look for a part-time job."

Seventies

Stephen A. Smith, B.S. '70, of Tempe, AZ, ran in the 100th Anniversary Run of the Boston Marathon April 15, 1996. He was able to finish, although enmeshed in a field of over 40,000 runners.

William Size, Ph.D. '71, is director of the geosciences program at Emory University. He writes that he "spent a month in China in August at the IGC and had a great field trip across Tibet, from the Mongolian desert to Nepal."

Dave Ripley, B.S. '65, M.S. '72, works in ground-water management for the North Dakota State Water Commission. He recently retired as the men's soccer coach at the University of Mary.

Gary Lobdell, B.S. '73, has been promoted to manager, photogrametry of the Chicago-based Sidwell Co. He manages all topographic and planimetric data collection, editing, analytical aerial triangulation and digital orthophoto production for Sidwell.

Christopher T. Ledvina, B.S. '74, and his wife, Nancy Howe, announce the birth of triplets: Daniel, Rachel and Carrianne, on December 6, 1996. Chris, a professor of mining at Northeastern Illinois University in Chicago, was featured in a September, 1996, *New York Times* article about a coal museum he has established in West Frankfort, Ill. The museum opened August 15 with the help of donations from the mining industry. The article said this was the world's only museum at the bottom of a mine shaft.

Having decided even before graduation that geology would not be a career choice, **Lowell Bostrom**, B.S. '75, currently owns and operates an Ace Hardware store in the resort community of Woodruff, WI. He is currently building a new store and is developing the adjacent commercial property. "The hardware business was something I found by accident," he writes, "and something I thoroughly enjoy."

GeoSciences is for alumni and largely about alumni. Please take the time to complete and return the information form at the end of this issue. Just as you like to read about classmates and other alumni, they'd like to know the latest about you. Your news is important to them and to us in the Department. Send along a recent photo, too, but let us know if you want it returned.

Elisabeth Brouwers, B.S. '72, M.S. '77, has been with the Geologic Division of the USGS in Denver, CO, for 19 years. After the division was reorganized last year, she was assigned to the National Cooperative Geologic Mapping Program, working with ostracodes. At present, Brouwers is an associate central regional geologist, working as Central Region contact/liaison with the state geological surveys, other federal cooperators, international activities, and overseeing the division common-use laboratories and support functions.

Patricia Santogrossi, B.S. '74, M.S. '77, is now principal geologist in the Department of Deep Water Geology of Vastar (formerly ARCO Oil and Gas Company) in Houston, TX. E-mail address: trisant@aol.com

Betty J. Evans, B.S. '78, has just accepted a position as application specialist at Space Imaging EOSAT, a private company launching a satellite to collect IM resolution panchromatic data. She is now based in Thornton, CO.

John D. Mitchler, B.S. '78, works for Harding Lawson Associates as a senior cost schedule manager overseeing the schedules and budgets of environmental cleanup programs. An avid mountain climber, Mitchler was recently the subject of a feature article in the *Denver Post* after having been named the first person to scale the highest points in all 63 Colorado counties. E-mail address: jmitchle@harding.com

Cummins Engine Co. has named **Christine Mangieri Vujovich**, B.S. '74, M.S. '78, vice president for bus and light commercial automotive and environmental management. Vujovich joined Cummins in 1978. She was named vice president for product planning and environmental management in 1985.

Eighties

Carl Steffensen, B.S. '80, is into his 15th year with Vastar Resources (formerly ARCO Oil and Gas Co.) in Houston. Having worked assignments in offshore exploration and development, onshore Mesozoic/Paleozoic basins, and lower 48 frontier exploration, Steffensen is back working the Onshore Gulf Coast Mesozoic trends. Focusing mainly on the south and east Texas areas, he writes, "I've been hooked on carbonates ever since our field trip to the Florida Keys with Phil Sandburg in 1980!" Recently, Steffensen presented posters on fractured reservoir studies and foreland basin exploration efforts, and this year co-authored a paper on the source rock potential of the Nonesuch Shale for the Institute on Lake Superior Geology annual meeting. Steffensen is also co-chair for the Houston Geological Society's North American Exploration Group. In his spare time, Steffensen acts as deputy commander for a local Civil Air Patrol squadron and works on numerous remodeling projects around his 30-year-old home. He and his wife, Frances, have two daughters.

Steven L. Forman, B.S. '81, is currently associate professor of geological science at the University of Illinois at Chicago where he teaches and conducts research in Quaternary geology and paleoclimatology. "My family and I moved from Ohio State University in Columbus, back to our Chicago home," writes Forman. " It's good to be back at the U of I." Forman also set up a luminescence dating research laboratory. Research there will focus on the loesses of Illinois. Forman credits Hilt Johnson's courses for starting him "on the path into the Quaternary." E-mail address: SLF@uic.edu

Corinne Pearson, M.S. '81, writes that she and her family just moved to The Hague for six months to a year following her husband's job with Amoco. Letters can be sent via: Expatriate - Netherlands (The Hague)/ PO Box 4381/Houston, TX 77210.

Lawrence Fieber, B.S. '83, is an environmental consultant at Mostardi-Platt Associates, Inc. Currently he manages a staff of 15 degreed scientists performing environmental investigations of land water. He also speaks, writes and teaches civil engineering courses for technical environmental professionals. He has three children, ages six, two and newborn.

Michael Sweet, M.S. '83, is a sedimentologist/development geologist now based in Houston with the Gulf of Mexico group of BP Exploration. He was previously with BP Exploration in Aberdeen, Scotland.

Mark P. Fischer, B.S. '87, recently resigned his position at the Exxon Production Research Company in Houston, TX. He is now an assistant professor in structural geology at Northern Illinois University (DeKalb, IL) and began his teaching career in August 1995. Since then he has started field projects in Mexico and southeastern Utah, and is looking for interested graduate students. Last summer he taught at NIU's field camp in the Black Hills.

Nineties

Christopher Hedlund, B.S. '90, has completed his Ph.D. at Colorado State University and now is employed with Shell Oil in Houston, TX.

Kelly Rust, B.S. '90, M.S. '93, is a graduate student at the University of Maine in Orono. He is using techniques from structural geology and geophysics to understand the fracture flow hydrogeology in crystalline rocks. E-mail address: Krust51@maine.maine.edu

Erika Goerich, B.S. '95, works for a national environmental consulting firm, primarily on asbestos abatement projects in Chicago. She also does asbestos surveys in shopping malls across the Midwest. Goerich writes that she is "getting moved over to the 'environmental' side of the company to do Phase I Environmental Site Assessments, and other geology-related work (a promotion for me!)" E-mail address: egoerich@aol.com

Crystal Lovett, B.S. '97, received a scholarship from the American Geological Institute in September 1996. As a junior, Lovett also received a scholarship from the organization (see Geosciences Spring 1996, p. 3) Lovett, who comes from Stafford, VA, concentrated on environmental geology as an undergraduate at the University and is in the process of applying to graduate schools in environment management and law programs.

Former Faculty

George Klein, a former faculty member in the department (1970-93), has left the New Jersey Marine Consortium and opened a consulting practice specializing in "petroleum geology, coastal geology, and higher education change strategies."

Fred Donath, former head of the department (1969-77), received the University of Minnesota Outstanding Achievement Award in February 1996.

REMINDER
You can send your update for the Alumni News via e-mail:
geology@uiuc.edu

Let's Keep In Touch

Please take a few minutes to let us and your classmates know what you've been doing: promotions, publications, election to office, marriage, parenthood, moving, awards. We'd all like to hear from you. Send your news to the Department of Geology, 245 Natural History Building, 1301 West Green Street, Urbana, Illinois, 61801; fax 217-244-4996; **e-mail geology@uiuc.edu**.

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