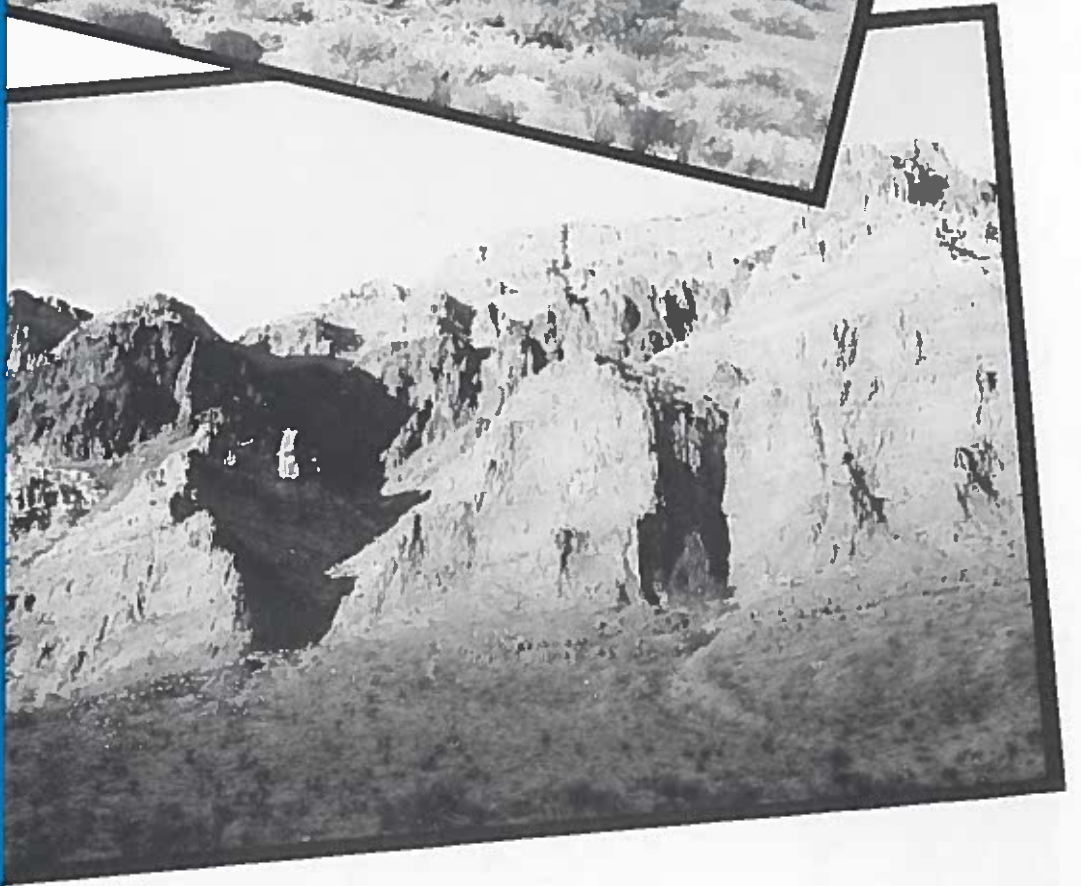
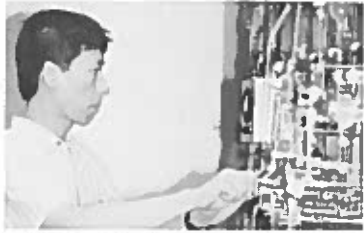


Geosciences

Department of Geology
Alumni Newsletter
Fall '94



U N I V E R S I T Y O F I L L I N O I S



GeoSciences

Alumni Newsletter

FALL 1994

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Reply Form

Cover Photos: Beautifully exposed Paleozoic section along the west face of the Arrow Canyon Range, southern Nevada. Strata cropping out along the range front were the focus of several theses under the direction of emeritus professors Dr. R.L. Langenheim and Dr. A.V. Carozzi in the 1960s. More recently, the section has been studied by Ph.D. candidate Fred Siewers to better understand the origin of unconformable surfaces in limestones.

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

Staff: Department Head: R. James Kirkpatrick; Asst. to the Head: Peter A. Michalove; Editor: Vanessa Fauric; Designer: Jessie Knox; Admin. Secretary: Patricia Lane.

Message from the Department Head

R. James Kirkpatrick



Dear Alumni and Friends,

At the start of this new academic year, I look forward to returning as Head of the Geology Department and accepting the challenges of the future. I especially want to thank Hilt Johnson for his outstanding job as Acting Head this past year; Hilt has worked hard to improve the operation of the Department and to implement our new undergraduate program options. He will continue as Associate Head for the next year and then retire in the summer of 1995. More about that will appear in the spring 1995 newsletter.

I am particularly pleased with our new Geology Alumni Achievement Award and with Jack Simon's selection as its first recipient. Jack has been an outstanding leader for our science and profession and a longtime friend of the Department. There is an article about Jack and the award in this issue of *GeoSciences*, and we hope many of you will be able to attend the dinner in his honor Nov. 18. We will make this award every year and, because the Department has many prominent alumni, we will continue to need your help in selecting new awardees.

One of the University responsibilities I retained during my sabbatical this past year was to chair the Campus Task Force on the Environment. Our charge was to recommend changes in the campus's programs in environmental studies broadly construed. The task force's report is now complete, and preliminary meetings with the campus administration indicate that many of the recommendations of this report are likely to find their way into our programs. I am especially happy with the focus of the report on improving the quality and quantity of undergraduate education in environmental science and with the recognition accorded the Geology Department's rapidly expanding environmental programs. The task force has not recommended a broad, general environmental studies major, but rather greater focus on environmental issues within the context of rigorous departmentally based majors. This is the approach that our Department has taken. The application of geological principles and knowledge to environmental concerns has become a central focus of geology, although not the only one, and the Department will continue to expand its efforts in this direction.

Sincerely,

A handwritten signature in black ink that reads "Jim Kirkpatrick". The signature is written in a cursive, slightly slanted style.

R. James Kirkpatrick
Department Head

GeoNews

The new award is the result of nominating letters received by a review committee of faculty and alumni.



Simon to receive first Geology Alumni Achievement Award

Jack A. Simon, A.B. 41, M.S. 46, has been named the first recipient of what will be the annual Geology Alumni Achievement Award.

The honor will be presented to Simon on Friday, Nov. 18, 1994, at a special dinner at Jumer's Castle Lodge in Urbana. A reception will begin at 6 p.m., followed by the dinner at 7 p.m. All alumni are invited to attend. To make reservations, send \$25 per person to Pat Lane, Department of Geology, University of Illinois, 1301 W. Green St., Urbana, IL 61801. Make checks payable to the U. of I. Department of Geology. Reservations must be received by Nov. 10.

The new award is the result of nominating letters received by a review committee of faculty and alumni. Any of three criteria can be the basis for selecting a recipient: a career of outstanding professional achievement; outstanding academic or research achievement; or outstanding service to the University of Illinois Department of Geology.

Simon easily satisfies them all. A coal geologist by training, he rose through the ranks of the Illinois State Geological Survey to become chief in 1975. That same year he also received the prestigious Gilbert H. Cady Award from the Coal Division of the Geological Society of America. Simon helped determine the direction of coal geology research and establish guidelines for



Simon

environmental regulations. He has received honorary resolutions from both the Coal Advisory Committee and the Environmental Protection Agency. In 1982 his title changed to chief emeritus at the Survey.

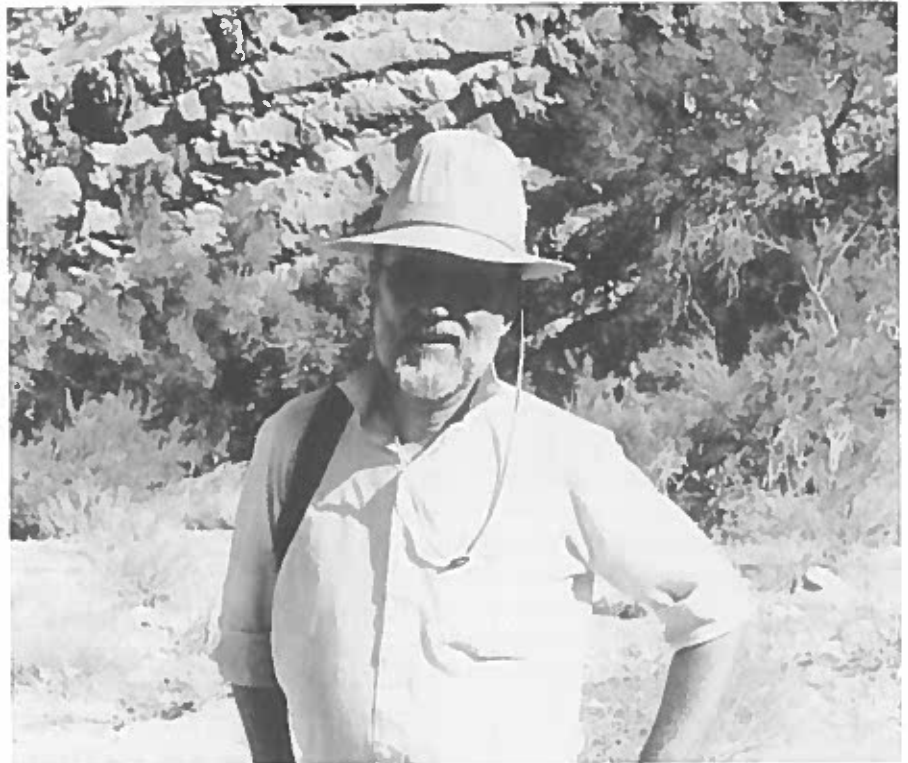
Friends and colleagues are invited to send letters of congratulations and/or reminiscences to the Department for inclusion in a book to be presented to Simon at the November award dinner. Letters should be sent to Pat Lane at the above address by Oct. 24.

Sandberg to retire after fall 1994 semester

After 30 years at the University of Illinois, Professor Philip Sandberg will officially retire in December. He has accepted a position at Radford Univer-

sity in Virginia, where he will be involved in developing the curricula for its new College of Global Studies.

The offer was irresistible to



Sandberg because it connects many of his interests—foreign languages, study abroad and computer technology—as well as the opportunity to be instrumental in the establishment of a whole college.

The Louisiana State and University of Stockholm graduate has lived in and traveled to numerous countries throughout his life and speaks several languages. His research work has been just as varied, from ecology to zoogeography to micropaleontology and carbonate sedimentology. In recent

years, he has become more involved in computer-aided learning and has strived to educate larger numbers of people about the sciences.

Arriving at the University as an assistant professor in 1965, Sandberg has committed himself to teaching

general-education geology courses and was an instructor for the U. of I. field courses in the Bahamas during the 1960s and '70s. He was acting Department Head in 1977-78 and was named an associate in the University's Center for Advanced Study.

Faculty garner honors, including top campus teaching award

Associate Professor **Stephen Marshak** and graduate teaching assistant **Timothy Paulsen** were two of 11 recipients of the third annual Harriet and Charles Luckman Undergraduate Distinguished Teaching Awards, the principal campus awards for excellence in undergraduate instruction. The honors were presented April 28 at the annual Instructional Awards Banquet in the Illini Union.



Left to right: Steve Marshak, Sandy Schultz and Timothy Paulsen

The Luckman award is supported by a \$375,000 fund established in April 1991 by the U. of I. alumni for whom it is named. It replaced and improved upon the previous Campus Awards for Excellence in Undergraduate Teaching program. Marshak also received one of four William F. Prokasy Awards for Distinguished Teaching from the College of Liberal Arts and Sciences at its annual awards ceremony April 25 in Assembly Hall. This award is named for the former dean who established it to promote exceptional achievement in undergraduate teaching.

Associate Professor **Jay Bass** was a finalist for the Oakley-Kunde Award for Excellence in Undergraduate Education at the campus level. The award recognizes a faculty member for his involvement with and guidance of undergraduates in research. He received a special certificate from the provost and vice chancellor for his achievements in this area.

Also, in a collaborative project with **John Kieffer** of the Department of Materials Science, Bass received a National Science Foundation grant for



Bass

Bethke



"Visco Elastic Relaxations in Fragile Glass-Forming Systems."

Professor **Craig Bethke** recently received the Academie des Sciences Professorship for a year of study at a university in France. He plans to spend the year at Ecole des Mines de Paris (Fontainebleau).

Awards dinner honors students

Several students received honors at the annual Geology Awards Dinner last May in the Colonial Room of the Illini Union:



Left to right: Melinda Tidrick, Melinda Legg, MS 94, Amy Berger and Teresa Beckman

Alumni Outstanding Senior Award: Ryan Maulding, Christine Puskas

Estwing Pick Award: Kevin Toohill

Outstanding TA Award (Fall 1993): Tim Paulson

Outstanding Woman Graduate Student Award: Christie Demosthenous

Morris M. & Ada B. Leighton Award: Steven Schimmrich

Norman R. Sohl Graduate Research Award in Paleontology: John Werner

GeoThrust Alumni Fellowship:

Tim Paulson

Harold W. Scott Fellowship: Terry

Beckman

University Fellowship: Terry

Beckman

Also, Eric Holdener, M.S. 91, Junzhe Liu and John Werner all received Graduate College Travel Support Grants to give papers at professional meetings.



From left to right: Robert Ylagen, Christie Demasthenous and Timothy Paulsen

Degrees conferred by the Department of Geology

October 1993

M.S. - Sharon L. Qi

January 1994

B.S. - Bruce P. Miller

Ph.D. - Mary Ann Glennon

May 1994

B.S. - Michael R. Osterhoff, Christine

M. Puskas

Ph.D. - Wanbing Li

August 1994

B.S. - Laura J. Becker, Ryan P.

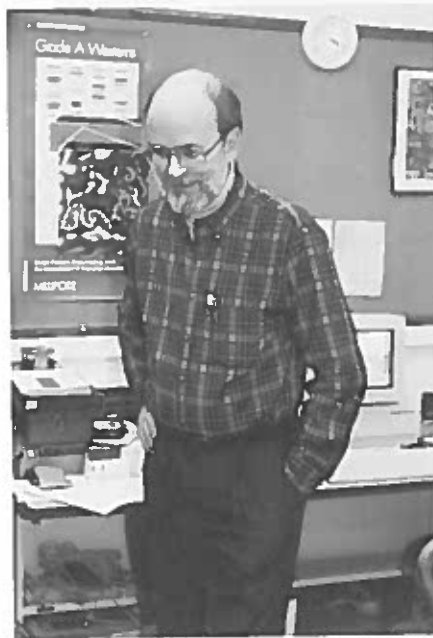
Maulding

M.S. - Melinda A. Legg, John E.

Werner, Frederick N. Wright

New class offers cross-age learning electronically

Professor Philip Sandberg has developed a new course for college students to interact with grade school students as a way to make all of them more proficient with today's electronic technology as well as to learn more about the sciences.



Sandberg

Project Geo Help, which stands for Geologists-Educators On Line History of Earth and Life Partners, started out in the spring 1994 semester as an optional extra credit project for students in the Geology 143 "History of Life" course. This fall it has been offered as a Freshman Discovery Course, part of the new campus initiative to revamp

undergraduate education that encourages more interaction between undergrads and tenured faculty members. The course is limited to 20 students, primarily freshmen.

The U. of I. students are divided into smaller groups and then assigned a "partner classroom" of primarily grade school students somewhere in the United States. Last semester, classrooms in Oregon, Florida, Virginia, Indiana, Ohio, Pennsylvania, Texas and California, as well as Illinois, participated in the project.

Communicating through electronic mail, the younger students ask questions about science, and the college students then research the topic and provide a detailed reply (after a thorough review and critique by Sandberg). Questions from last semester varied from "How old is the Earth?" to "What is the meaning of life?"

The goals of the course are not only to make people more electronically proficient, but to encourage cross-age learning. Sparked by Sandberg's interest in service education, he wants to reach larger numbers of students. He hopes the project will eventually expand by putting the questions and answers on a wider network to be accessible to all primary and secondary school students.

"We accomplished a lot of objectives," Sandberg said of the project's trial-run, "yet it didn't go as well as I had hoped. But I probably had unduly high expectations."

Although the teachers and grade schoolers were enthusiastic, Sandberg felt there was a lack of interpersonal dialogue. It turned out, the youngsters wanted to know about going to college and the college students themselves as well as about science-oriented issues.

This semester, Sandberg is having his students carry more of the responsibility for the course to encourage more interaction with the grade school students.

Scott honored by Michigan State

Professor Emeritus Harold W. Scott, A.B. 29 (LAS), A.M. 31, was awarded a Bronze Plaque from the Michigan State University geology department for services rendered as chairman of the department from 1969-74.

Scott was part of the U. of I. Department of Geology from 1937-67, and his research interests were in stratigraphy and a number of groups of



Scott

microfossils, primarily ostracoda and conodonts, as well as sponge spicules and foraminifera. He is noted for the discovery of conodont assemblages and also was involved in discovering major petroleum reserves in Libya.

He is the author of *The Sugar Creek Saga: Chronicles of a Petroleum Geologist*, and resides in Urbana with his wife, Joanna, B.Mus. 29.

Ph.D. candidate makes his mark in sedimentology

His background was initially in paleontology, but in the time Fred Siewers has been at the U. of I. working on his Ph.D., he's built a name for himself as a top-notch sedimentology student working with Professor Philip Sandberg.

Last spring, the Department showed its confidence in him and asked him to teach the core sedimentology and stratigraphy course, for which he had been a TA previously.

"I loved it," Siewers said. "The course is a real challenge. It's one thing to teach a lab, it's another to get up in front of 26 students twice a week for hour-and-a-half-long lectures. Illinois students are quite good."

Before he was an Illinois student, Siewers started out doing his undergraduate work at the College of Wooster, a small liberal arts college in Ohio. Originally from North Carolina and raised in Pennsylvania, he chose the college specifically to get a good, broad liberal arts education. One of his first classes was in geology, taught by U. of I. alumnus Fred Cropp, M.S. 56,

Ph.D. 58, and the interest began even though Siewers continued to take a variety of classes. By his junior year, he declared geology as his major with an emphasis on paleontology.

"(People in the geology department) do a lot of things outside, and they're a fun group of people," Siewers said. "They're a close-knit group, and the department had a very good faculty."

Siewers still maintained his other interests, but more as hobbies. The avid blues and jazz fan used to play a lot of guitar and was part of a bluegrass band while in college.

"Geology satisfies a lot of things," he added. "I can be outside doing the field work I like to do. But it also is fairly abstract, so there's an intellectual element. Reconstructing the Earth's history is fairly abstract, and I've just found it to be a very satisfying pursuit."

While working on his master's (which he received in 1988) at Vanderbilt University in Nashville, Tenn., Siewer's adviser suggested he work with limestones in part because the job market for paleo students wasn't very lucrative at the time. The paleontology came in handy, though, for all those fossils found in limestones. During his time in Nashville, he also did some hydrology work at the U.S. Geological Survey Water Resources

Siewers



branch that allowed him to see the "tremendous diversity" of limestones in the Nashville area.

Siewers came to Illinois later in 1988 specifically to study sedimentology of limestones with Philip Sandberg,

the kinds of surfaces in limestones that mark breaks in time. Looking at a cliff of rock as a record of Earth history, for example, there are surfaces in which the record is incomplete.

"Those are referred to as uncon-

develop new criteria for recognizing these surfaces, which are very subtle and often overlooked. He's also had success in finding how discontinuities from particular regions can be correlated over a broad area.

In the 500-700 samples he has been actively working with, the discontinuities are very different. The question became, "Does this represent a time when the limestone was actually exposed to the air and some of it was eroded away, or does this represent a completely submerged surface where the erosion actually took place on the sea floor?"

"I've been able to differentiate between ones that are exposed and ones that aren't better than what had previously been done," Siewers said.

With his thesis almost complete, Siewers is looking for his next step. He said he's interested in working on similar problems in different areas, given that it's all tied into reconstructing Earth's history. Whether it will be a postdoc appointment or a job in industry or something else entirely, the answer is still unknown as of this writing. One possibility is even to return a favor to his wife, Helen, who recently received a master's in landscape architecture. She worked as his field assistant out in the rugged Nevada terrain. Now she is going to the former



Siewers' field research is in an isolated part of Nevada.

who has an international reputation in the field.

"I was immediately impressed when I came here to interview with Philip," he said. "I knew that I needed a mentor, someone with a lot of experience but who would also allow me to do my own thing and work independently. He's treated me like a colleague from Day 1."

Siewers' field research is in central and southern Nevada, where he works on "hardgrounds" (limestone surfaces that became hard within the marine environment) in Middle Ordovician (Whiterockian) limestones.

"They're important for people studying fossil communities because certain kinds of organisms are associated with these hard substrates," he said. "Also, because they turn from sediment to rock quickly, the actual cements that grow between the grains preserve, or have the potential to preserve, the composition of the ocean-atmosphere system. So these surfaces can yield interesting geochemical information."

Siewers is specifically zeroing in on

formable surfaces," Siewers said, "or what I've been calling discontinuity surfaces. My thesis really broadened into understanding the origin and the stratigraphic significance of these surfaces—how a surface like that is formed and what it means."

His work has allowed him to

"Siewers likes the fact he can "do (his) own thing and work independently."





Of the 500-700 samples he has been actively working with, Siewers finds the discontinuities to be very different.

East Germany this fall to see how former Eastern Bloc countries are dealing with environmental issues.

"Depending on my job situation, I may go and be her field assistant after wrapping up all these projects," Siewers said. "Ideally, I'd have an academic position and she would be at a landscape architecture firm. We might even like to collaborate on a project some day."



Siewers works with the White Rock series of hardground-type limestones in central and southern Nevada.

Oklahoma alumni meet



Department Head Jim Kirkpatrick met with alumni at a luncheon in Tulsa, Okla., at the Marriott Hotel East last April. From left to right are Karl L. Goodall, A.B. 50; Kirkpatrick, Ph.D. 72; Robert W. Von Rhee, M.S. 77; Allen S. Braumiller, M.S. 57; Richard H. Voris, M.S. 52; John W. Shelton, M.S. 51; and Lester W. Clutter, B.S. 48, M.S. 51.

You're Invited

GSA Alumni Party

in Seattle, Washington

October 24, 1994
7 p.m. - 9:30 p.m.
Sheraton Hotel
Room 430

*Cash bar with chips, dips,
pretzels and nuts furnished.*

Alumnus Profile: Norbert Cygan

"I thought that professors just got up in front of the class, gave their hour talk and left. I didn't know they could be that interested in you."



Alumnus passes along appreciation for education

By John Spizzirri

Norbert Cygan, B.S. 54, M.S. 56, Ph.D. 62, espouses a passion for two things, the outdoors, the sciences and, well, three things, the University of Illinois. Retired now for nearly four years, he worked in many aspects of geology with Chevron for almost 30 years, retiring as director of geologic training and working as a sort of senior consultant for Chevron overseas petroleum.

Born and raised on the southwest side of Chicago, his only exposure to geology was through Boy Scout outings and the pages of National Geographic, whose photographs have inspired many young men and women to travel far afield. But mostly, says Cygan, he got into geology because he always loved the outdoors.

He enrolled at the Chicago Undergraduate Division of the U. of I. at Navy Pier in 1948, where he studied chemical engineering for two years before he was summoned into the Navy. Stationed aboard ship along the Atlantic Coast, Cygan kept up private

studies of geology and paleontology, discovering that his chemical engineering background was an excellent segue into the field of geology.

Having made officer grade during his short-lived naval career, he traded in his sea legs for the land-locked, rural environs of central Illinois, opting to finish his bachelor's degree at the Urbana campus. During his last two years, Cygan was able to concentrate solely on the geologic studies that, coupled with the obligatory field trips and the company of like-minded students and teachers, clinched his decision to become a geologist.

"The faculty and student friends at the University of Illinois probably made the biggest impact on my life in the 64 years or so I've been kicking around," Cygan emphasized. "They were just a different breed of faculty than what I was used to at a university. These people actually went out on trips and sat around with you in the evening. I thought that professors just got up in front of the class, gave their hour talk and left. I didn't know they could be that interested in you."

This new-found standard of attentiveness motivated Cygan to continue on to graduate school, where he met his future wife, Carol, B.S. 56 (Education). After receiving his master's

Now retired from Chevron, Cygan lives in Englewood, Colo.





Cygan is a director and instructor at Dinosaur Ridge in Colorado.

degree in 1956, he began a three-year teaching stint at Ohio Wesleyan University and married Carol a year later. The couple returned home to Illinois in 1959, and Cygan immediately set to work on finishing the Ph.D. he'd begun at Ohio State, teaching historical geology and spending his summers working with aspiring geologists at the U. of I.'s field camp in Sheridan, Wyo.

Cygan left the University, Ph.D. in hand, in 1962 to begin a long career with Chevron that covered many fields, both scientific and geographic. "I owe the fact that I was able to handle them to the University of Illinois method of education in geology," he said. "One of the things that the head of the department at the time, Professor George White, insisted on was that he was not making specialists, he was creating geologists. And he made sure that you had courses in every sub-field of geology that was available."

Cygan's first job was as a micropalaeontologist, scrutinizing the tiny fossils collected from sandstones and mudstones along the Gulf Coast. These fossils help determine the environment of deposition—the circumstances by which these stones were originally deposited and one among a variety of

clues that lead geologists to particular environments which are more likely to contain oil.

"If you're looking for oil being generated, you wouldn't look in a desert environment, you'd look to an environment that has a lot of organic material like a delta. If you're looking for oil being stored, you want a porous, permeable rock like clean sandstone (created from) beaches or sand dunes."

By the early 1970s, the United States was in the middle of an "energy crisis," spurred on by the 1973 Arab oil embargo against the United States, Western Europe and Japan. During the clamor to develop alternative energy resources, Chevron grabbed the bull by the horns and entered the nuclear arena, taking Cygan along for the ride. He had, up until this time, been applying his knowledge of math and statistics to early computer applications in oil and gas geology but soon found himself sleuthing for uranium as part of Chevron's quest for precious minerals.

Cygan hit pay dirt when he discovered a uranium deposit in Panna Maria, Texas, and spent nearly a decade acquiring coal deposits and hunting for gold, silver and copper. When minerals no longer seemed economical, he got

back into oil and gas, working as a consultant for Chevron on international collaborations that would take him to the Sudan, China and Siberia.

His experiences overseas taught him much about other cultures, about how they lived, how they struggled, their work ethics and the intricate strata of foreign science. In China, he found three levels of science operating at the same time. Where the older generation was made up of classically trained geologists, the up-and-coming students were studying American texts and modern geology techniques. Somewhere in between, but far less advanced, were scientists trained during the Cultural Revolution, subjugated to hand-copying pictures from American books.

The oil-rich tiara of Russia had set geologists there on a different course, one that eventually proved a dilemma and exposed Cygan to the harshness of a Siberian winter. Like their Chinese counterparts, the Russian geologists had mastered the specifics of classical geology, but to their detriment, they did not pass along their knowledge.

"Each specialist sort of kept the information to himself and filed it," noted Cygan. "Nobody ever integrated data. But keep in mind, they really didn't have to because all they had to do in the past pretty much was drill a hole. They drilled anywhere and found oil and almost never had a dry hole."

As these readily available resources became depleted, the Russians soon found they lacked the advanced technology to obtain new ones. "They needed to know how to integrate the material and learn new techniques in geophysics and how to drill deeper because their steel and pumps couldn't handle it."

Although he enjoyed the detective aspect of geology, "coming to conclusions from the evidence at hand," Cygan took early retirement in 1990 after nearly three decades in the field. In 1991, his wife, Carol, was diagnosed with leukemia. After a year-long battle with the disease, she died in January 1992, but not before she influenced Cygan's continuing role in science and



Cygan

education, one that gives him just as much satisfaction as did his work with Chevron.

Wherever Cygan's job took them, Carol got a job teaching elementary school science, and he often visited her classes to teach the kids about rocks and fossils. In 1993, Cygan established a scholarship in his wife's name for the teaching of elementary school science and had, by that time, begun working at the national level on earth science education with the American Geological Institute and through grants from the National Science Foundation and various geological organizations.

He now teaches geology to science teachers through the Colorado School of Mines and still carries his box of rocks and fossils with him to schools throughout Colorado, Nebraska and Wyoming, sharing his knowledge of the Earth with students from nursery to graduate school.

"I'm very proud to be a director and instructor of an outfit here in Colorado called Dinosaur Ridge," added Cygan, a resident of Englewood. The ridge serves as a window to prehistory, where kids and adults alike can hunt Jurassic dinosaur bones along one side and follow the paths cut by dinosaur footprints through the

Cretaceous period on the other side.

"The most satisfying thing is working with the elementary school students who've suddenly realized that they can figure things out," he said. "They might look at a rock and figure out that this might be the sand deposited in an old river channel, or we'll find bones and have kids figure out which bone it is. We take a second-grader and we show him a bone that has blades on it. What bone do you have that has blades on it? Well, a shoulder blade. Then we have the kids work out how much bigger it is than their own. I really love it when the kids come up with the answers themselves."

In recognition of his recent work, Cygan received the 1994 Public Service Award from the American Association of Petroleum Geologists. His work in science education also has brought him back to his alma mater, where he has worked with teachers-in-training in the College of Education on how to talk about dinosaurs. He combines his roles as alumnus and geologist by serving on the GeoThrust Committee, which is "trying to raise money so the Department can continue its fine program of research and teaching that it has been known for over the years," he said.

To further alert fellow alumni to

the challenges faced by the Department, Cygan recently hosted a luncheon for 40 Denver-area alums, assisted by Department Head Jim Kirkpatrick and Associate Dean Jim Schroeder.

Cygan has had the distinct honor of practicing Professor White's approach to education throughout the world and to people of all ages, an honor for which he credits the short time spent, geologically speaking, at the University of Illinois.

"I've had a wonderful career," Cygan said. "I was a kid out of Chicago and my father was a blue-collar skilled worker. If it wasn't for the people at the U. of I., I would never have gotten a degree in geology."

Discover Denver's Dinosaurs



Dinosaur Ridge 1994 Season

For information on Open Ridge Days and museum tours, call (303) 697-DINO

Faculty Profile:

C. John Mann

"Much of geology is still qualitative in nature, that is, descriptive. These areas can be quantified more."



Working out the marriage of math and geology

Given the subjective nature of geology in general, Professor C. John Mann is working to pull the field into more of an objective framework. Gradually, the field does seem to be moving in that direction, but not without a little kicking and screaming along the way.

"There are some areas of geology that are quite well quantified already—geophysics, geochemistry, engineering geology," Mann said. "But much of geology is still qualitative in nature, that is, descriptive. These areas can be quantified more."

Mann's primary interest is in getting mathematical methods into geology, sometimes to the grunts and groans of other geologists.

"That's the reaction one gets often times," he said and laughed. "But the students who come through now are well computerized. It's really a problem in terms of correctly expressing the geological variables in a mathematical sense. That is, using them in ways that are mathematically correct but have

geological meaning to us. It permits us to do things more objectively than the traditional subjectivity of descriptive methods."

For example, Mann is a stratigrapher by training and said stratigraphy is one area that's difficult to quantify because it is largely descriptive. He is doing some work in applying set theory to stratigraphic units to define them in mathematical terms and then to use those terms for further manipulation.

One of the reasons he believes geology is so subjective, and therefore more difficult to quantify, is because it is so much more complex as a whole than, say, physics or chemistry.

That concept is easy to grasp when one enters Mann's long, narrow office in the Natural History Building. The shelves that line the walls on each side of his desk are filled, floor to ceiling, with books and papers and notebooks—the signs of more than 30 years of effort at the University making this marriage of math and geology work.

"The simple relationships aren't always obvious in geology," he said.

It may seem obvious when Mann says one has to have a good background in both math and geology to be a good mathematical geologist. But he really means more than that.

Mann



"You can't be a geologist who does cookbook mathematics. Nor can you be a mathematician who doesn't understand geology. That's too dangerous. You have to know both of them to do it right because it's too easy to make mistakes."

For example, one of his interests is in probability density functions to describe geologic phenomena. He explained how the Gaussian Curve, which is a symmetrical distribution function for measurements of error, is a mathematical concept that just doesn't work in geology.

"Mother Nature does not use the Gaussian Curve," he said. "That's great for error analyses, but I've been trying to find Gaussian distributions in natural geologic data. We can't find them. But once we know the correct probability density function, we know exactly what the natural uncertainty is in our data."

"After many years, I could not see any rhyme or reason to what was going on," he continued. "Now, more recently, I know you can predict what these distributions are if you use the right knowledge about the geology, which I think is interesting."

One way all of this information and mathematical methodology is applied practically is in determining probabilities for nuclear waste storage. As a consultant for the U.S. Nuclear Regulatory Commission, the Nuclear Energy Institute, the U.S. Council for Energy Awareness and Sandia National Laboratories, Mann is actively involved in predicting the safety and uncertainty of estimates for nuclear waste disposal. He also serves on the peer review panel for performance assessment of Sandia's Waste Isolation Pilot Plant, a high-level nuclear waste repository for defense waste and experimental waste from national labs that was designed to demonstrate the safety of this kind of repository.

"How certain are we that by putting the nuclear waste in the ground that it's not going to cause environmental problems 10,000 years (the U.S. standard) from now?" Mann said. "One

has to simply divide it up into as much detail as possible. Some of the things we know about nuclear waste, we can predict fairly accurately. For example, the chemical parameters in terms of leaching of the waste over time. Particularly in the western states, one wonders how much the climate is going to change in 10,000 years. Well, the climatologists just can't tell us. The only thing we have to work with is evidence of climate change from a geological standpoint."

Once the estimates for all the major components, and how well-known the



Mann focuses on making geology more quantified. values are for those components, are in hand, then the most critical or sensitive parameters can be determined (sensitivity analysis) by changing certain values and seeing how they affect the end result. Sometimes a very small change in a variable can have a significant change in the result.

"When we have all this together, we can identify which of all these parameters is going to be the most critical and those are then looked at in more detail. We attempt to constrain

them, in one way or another, as tightly as possible.

"It may be necessary to go out and collect more data if the uncertainty of our measurements is large. Or there may be some other way to constrain it so it can't fluctuate so much, for example, changing the engineering aspects of it."

A potential commercial waste site in Nevada's Yucca Mountain poses more questions, he said, because it is a much more active tectonic area and has some relatively recent vulcanism nearby. However, it has many advantages, too, because it is a semi-arid area and the repository would be 800 feet above the saturated groundwater level with very little percolation of water downward.

"It's a matter of looking at what's there and coming to an intelligent conclusion," Mann said. "Basically, the geologic environment is pretty safe from a nuclear waste standpoint. Over 10,000 years, the geological environment does not change very rapidly."

Concerned with the future of energy given the limitations of today's more widely used sources, Mann thinks the world will have to look to nuclear energy for the near future, in spite of how people feel about it.

He and Professor Emeritus Ralph Langenheim are currently working on a textbook entitled, *Geology of Energy Resources*, and Mann teaches the "Geology of Energy" undergraduate course in the Department (as well as "History of the Earth").

Even though Mann's research interests revolve around mathematical methods, his courses don't allow for much math to be worked in to any great extent. But that doesn't diminish the value of teaching for him.

"I enjoy it," he said, then laughed. "The students don't always enjoy it. But that's what the University is—it's the teaching. The students are what keep you young, and they're always a challenge."

"The research is rewarding in a professional sense, and the teaching is rewarding in a mental and personal sense."

Student
Profile:

Ten-hung Chu

"Nowadays we talk about environmental impact and contamination because we don't really appreciate the Earth and how much it can take."



Geochemist adds a piece of the puzzle to big picture

Graduate student **Ten-hung Chu** began his geologic studies in Taiwan but came to the University of Illinois five years ago to work on his doctorate in geochemistry. The first year was spent talking to professors about their interests and just feeling his way around before beginning work with Professor Tom Anderson.

"Even when I was in high school back in Taiwan, chemistry and biology were my best subjects," Chu said. "In my sophomore year in college, I worked as a lab assistant during the summer. I worked for a professor who was working on stable isotopes in chemistry. So I fell in love with stable isotopes."

Chu's thesis project involves sulfur isotopes from core samples taken from a formation at Leicester, about a three-hour train ride north of London, England. He uses the sulfur isotope as a tool to understand the history of those rocks.

"For each sample of rock, I grind it and separate it into four parts of sulfur," Chu explained. "The whole process takes about six hours. After that, I have to combust those compounds into sulfur dioxide at 900 to 1,000 degrees Celsius. That will take another hour or so."

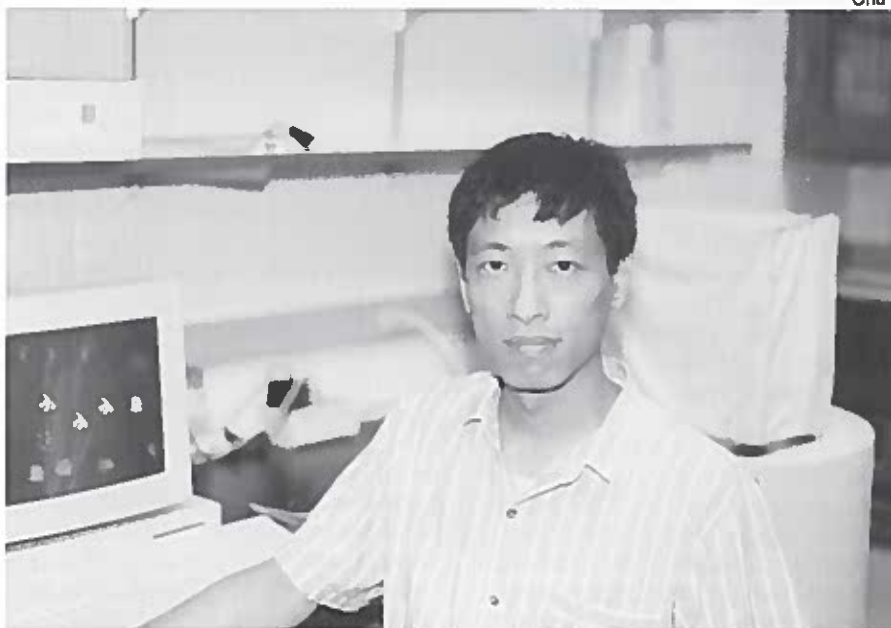
So far, Chu has done about 60 samples and has collected another 150 more. The samples are from different localities along the formation that spreads from the northeast of England to the southwest. It's organic-rich clay, and people have made it into fuel bricks for years and years.

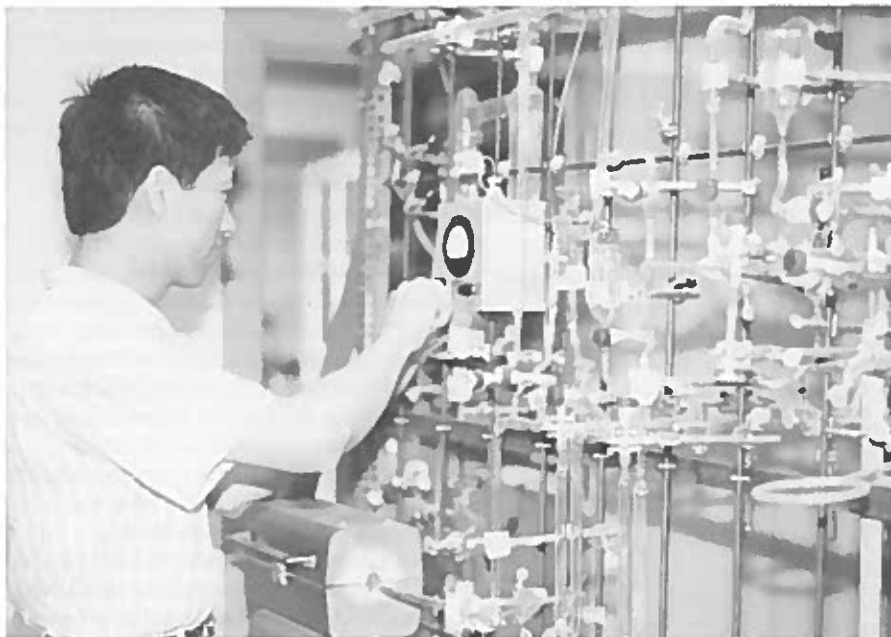
"You can just light it up and it'll start burning," Chu said. "So it has petroleum potential. We want to understand why petroleum formed and why we have petroleum here and not there, and also understand the process of degradation of an organic compound."

Other similar studies have been done before in the California and Florida areas, Chu said, but not to the same extent as this site. And those sites have not had as much organic and stratigraphic background research done on them.

"The most interesting part will be the end of the analysis and data collection," he said. "With data itself,

Chu





Despite his computer interests and Department duties, Chu spends a lot of time in the lab "getting his hands dirty."

there is no meaning. When you put those numbers together with other things, other evidence, other people's research results, you can sort of put together a puzzle and see a story. It's just routine hard work from collection to analysis.

"My research is a small piece of the puzzle; it's going to fit into a bigger picture. I haven't seen the big picture yet because there's still a lot of work to it. But in a way, we can see more and understand more about the Earth, then we can get more out of it. Nowadays we talk about environmental impact and contamination because we don't really appreciate the Earth and how much it can take."

Working with Anderson has been beneficial for him, too. Chu said he has a way of keeping one step ahead all the time. "I'll come in with a lot of questions, and it's like he already knows what I'm going to ask and pulls out a paper and says well this will help solve your problem. He's a very good adviser, and he's also a good person."

Staying on his targeted goal of finishing the thesis by the summer of 1995, Chu plans to analyze another 40 to 50 samples and then begin putting his story together. The worst part of his

work is without question the reading, he said. By reading a lot of references, though, he can find out what other people are looking at in regard to similar problems, how their perspectives differ and why he should think differently.

His summer was spent mostly in the windowless lab in the basement of the Natural History Building, surrounded by glass tubing and vessels, chemicals and a mass spectrometer. Most of his work doesn't involve using computers, which he loves to do, but rather conducting chemical extractions—"the dangerous part," he joked. "We get our hands dirty."

Chu has found a way to indulge in his computer interests, however, as the Department's all-purpose, in-house computer expert and troubleshooter. The computer administrator the Department used to employ was only available for short periods of time, so many people just started informally asking Chu for help and advice. After one semester, the Department officially hired him. During the summer, six new Macintoshes were purchased for the secretarial staff, and Chu did the installation and instruction. He also just likes to play around on the Internet

network, reading about world events, new computer hardware and programming development.

"I have my work station here in the lab so people can send messages to me," he said. "I like the job because I like to have interaction with people and solve problems on-site. If a problem is not urgent, I can schedule it around my work." Then he laughed and continued, "I'm a geologist first and a computer scientist second."

But as much as he enjoys his work in the Department, Chu also feels eager to finish his thesis and move on.

"Five years is enough," he said. "After that, I want to get a job, see if I can find some place to explore more of my interests and see if I can contribute my knowledge to something."

"At this point, I'm looking more into industry because, after so many years in school, you sort of get tired. It's good to stay in school because of the resources and the impact of the people around you. It's very stimulating and gets you thinking. But with an undergrad, master's and doctorate, it'll be more than 10 years in school. So I need some change. I want to see something different."

One major change he's already experienced in his life was the June 24 birth of his first child. So in addition to working, he likes to get home and spend some time with his daughter. But it took some initial adjustment. For the first couple of weeks, he didn't even go into the lab because he wasn't getting any sleep. But now that he's settling into fatherhood, the urge to move ahead is still with him.

"When you stay in a lab for so long, you get isolated," Chu said. "You work on your own thing, your own thesis. But you don't get to interact with people a lot. And personally, I would like to have more impact on human life. My ideal job would be as an on-site consultant. Doing research is great because you explore unknowns. But a lot of times I ask myself, so what's the deal of this for human beings? In the long-term there is something to it, but I sort of want to see it now. I'm impatient."

Alumni News

GeoSciences is for alumni and largely about alumni. Please take the time to complete and return the information form you will find 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 a recent photo along, too, but let us know if you want it returned.

The following notes are 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.

OBITUARIES

James S. Cullison, A.B. 28, died May 28, 1994, in Tallahassee, Fla., at the age of 87. Throughout his career, he was a petroleum geologist with Creole Petroleum Corp. (Venezuela), Continental Oil Co. (United States and Egypt), Sahara Petroleum Corp. (Egypt), Oasis Oil Co. (Libya) and Dubai Petroleum Co. (Persian Gulf). He was a member of the Geological Society of America and a fellow since 1945, the American Association of Petroleum Geologists and numerous scientific honorary fraternities. Cullison was also listed in *American Men of Science*.

He was chairman of the geology department at Florida State University from 1950-54 and is survived by his wife, Lorene, a son, a daughter, a brother, eight grandchildren and 15 great-grandchildren.

Almyra Dameier Love, A.B. 29, A.M. 30, died Dec. 4, 1993, in a Fayetteville, Ark., hospital at the age of 99. She was a member of Sigma Xi and Sigma Delta Epsilon and was a part-time instructor in the U. of I. Geology and Botany Departments. She also taught history, reading, math and science at several high schools over the years.

She wrote a weekly nature column for a local newspaper for many years and had a great interest in birds, geology, geography, plant life and astrology. Husband William W. Love preceded her in death.

Carl J. Neer, A.B. 33, died Feb. 23, 1994, at Sarasota (Fla.) Memorial Hospital at the age of 85. He was a member of Theta Delta Chi and was a farm and geology consultant as well as an independent oil producer. He founded and was president of Neer Oil Corp, which operated in Illinois and Indiana.

In 1976 he became semi-retired and moved to Sarasota, Fla. He was a member of the U. of I. Presidents Council since 1967. His wife, Mary J.

Martin, preceded him in death.

He is survived by a sister, a brother, a nephew and a niece.

Thelma Chapman, A.B. 33 (LAS), wife of Emeritus Professor Carleton Chapman and one-time Department secretary, died March 28 at the Champaign County Nursing Home after a long illness. She was 86. Along with her husband, survivors include a son, John Chapman, a brother and sister and one grandchild.

After working 12 years as Department secretary, she then worked 12 years for the Geological Survey as a research assistant of chemistry.

Memorial contributions may be made to the Alzheimer's Association East Central Illinois Chapter, Box 962, Champaign, IL 61824.

Eugene H. "Buck" Schroth, M.S. 36, died Dec. 31, 1993, at age 88 at St. Luke's Hospital in Phoenix, Ariz. He was a former biology teacher and coach for Urbana and Monticello schools and was a former high school principal.

He was manager of the U. of I.'s Allerton House for 15 years and volunteered for three years as a nature lecturer and tour guide. Also at the U. of I., he was an announcer for track meets for 31 years and was a sports timekeeper for 28 years.

He is survived by his wife, Maxine, a son, a daughter, a sister and three grandchildren.

Courtland T. Reid, B.S. 40, M.S. 41, of Tybee Island, Ga., died Oct. 25, 1993, at Candler Memorial Hospital in Savannah, Ga., at the age of 83.

He was employed by the National Park Service in park planning until his retirement in 1972. He was also a World War II Army veteran.

His wife, Anna, preceded him in death. Survivors include a daughter, three grandchildren, a brother and a sister.

William A. Hanson, B.S. 51, died Dec. 2, 1992 in Cape Coral, Fla., at the age of 72. He was a World War II veteran in the U.S. Navy and is survived by his wife, Lois, three daughters, a brother and several grandchildren and great-grandchildren.

FACULTY

A special section about the Southern Lake Michigan Coastal Erosion Study that appeared in the *Journal of Great Lakes Research* (Vol. 20, No. 1, 1994) was dedicated to the late **Jack L. Hough**. The collection about the geology of Lake Michigan is the largest to appear in one place. Hough spent much of his life studying the geology and history of the Great Lakes, especially Lake Michigan.

Among his more notable contributions to Great Lakes research were the first bottom-sediment map of Lake Michigan, the first estimate of magnitude of the Chippewa low stage of Lake Michigan and *The Geology of the Great Lakes*—still the most comprehensive collection of information about the Great Lakes. He was in the Geology Department at the U. of I. from 1947-64.

Adjunct faculty member **Keros Cartwright**, Ph.D. 73, principal geologist and head of the Hydrogeology Research Laboratory at the Illinois State Geological Survey, has received a Groundwater Science Award from the Illinois Groundwater Association. The award recognized his outstanding lifetime commitment to research in groundwater science, resulting in significant advances in the protection of groundwater.

Graduate Research Assistants **Junzhe** and **Jianhui Liu** welcomed the birth of their daughter, **Melody**, on Feb. 10 at 1:47 p.m.

FIFTIES

Paul Regorz, B.S. 53, retired from the California Employment Development Department in 1982. He lives in Oceanside, Calif.

Robert Brownfield, M.S. 55, is retired and currently substituting on the weekends for a Catholic priest who wanted to have some time off. Brownfield also attends classes at the University of Iowa to keep up on stratigraphy and carbonate petrography. He directed research on subsurface of Pennsylvanian in southeast Kansas.

Professor Paul F. Karrow, Ph.D. 57, currently has five graduate students working with him in the Department of Earth Sciences at the University of Waterloo, Ontario. He has four children, three of whom are married, and has one grandchild and another one on the way.

His research is in Quaternary history, and he's written several papers on Toronto interglacial and Great Lakes history. He's had sabbaticals in 1970 and 1976-77 in California at Scripps, in 1984 at the University of South Florida in Tampa, and in 1992 at Victoria with the British Columbia Geological Survey. All were chosen, he writes, to allow winter field work.

In May, the University of Waterloo hosted the annual meeting of the Geological Association of Canada. Karrow and **Owen White**, Ph.D. 70, chaired an urban geology symposium, and a subsequent volume of the papers is planned to appear in 1995.

R.L. "Larry" Doyle, Ph.D. 58, currently in San Antonio, Texas, started the environmental consulting firms of HydroGeology Associates and HydroGeology International in June 1993. He writes that his Air Force and industry work keeps him busy. "Giovanna and I are still temporarily stateside, but keep our passports

current for our (we hope) inevitable return to foreign work."

SIXTIES

Paul R. Seaber, Ph.D. 62, received the Award for Distinguished Service in Hydrogeology from the Geological Society of America in October 1993. After a long tenure with the U.S. Geological Survey, he is now senior research scientist and professor of hydrogeology at the Desert Research Institute in Las Vegas, Nev. He is also senior hydrogeologist in DRI's cooperative investigation with World Vision and the Hilton Foundation in exploring for rural water supplies in Ghana.

Robert Farvolden, Ph.D. 63, senior scientist with the National Ground Water Association, was featured on the cover of the December 1993 issue of *Public Works*. Since joining NCWA in 1992, he has developed a new conference for the association, the Forum on Ground Water Remediation, which enables major participants in ground water remediation to meet and address current problems.

His decade-long "Aquifer Study of the Valley of Mexico" is scheduled to be published this year.

Richard E. Coon, Ph.D. 68, is a geotechnical consultant on corporate staff for CH2M Hill, a consulting firm in Bellevue, Wash., with a national and international practice in water supply, wastewater, transportation and environmental engineering. Coon works mainly with water conveyance tunnels, trenchless construction, rock engineering and mine drainage problems.

Last year, he had a consulting assignment in mainland China involving a water supply tunnel for Changchun in the northeastern part of the country. He worked with tunnel designers in the Jilin Province Hydraulic Institute.

SEVENTIES

Chang-Lu Lin, Ph.D. 70, was promoted to assistant to the deputy minister at the Nova Scotia Department of the Environment.

Bill Size, Ph.D. 71, is director of the geosciences program at Emory University in Atlanta, Ga. He attended the 25th anniversary meeting of the International Association for Mathematical Geology in Prague, Czech Republic, in November 1993. He is also associate editor for the GSA Bulletin and Nonrenewable Resources.

James W. Mercer, M.S. 72, Ph.D. 73, is president of the groundwater and environmental consulting firm of GeoTrans, Inc., in Sterling, Va.

At the annual meeting of the American Institute of Hydrology, he was presented the 1994 C.V. Theis Award for making a major contribution in the field of groundwater hydrology. Mercer has spent much of his career working in the area of separate-phase flow, originally in steam-water geothermal systems, now at hazardous waste sites involving nonaqueous phase liquids (NAPLs).

William I. Ausich, B.S. 74, is a professor of geological sciences at The Ohio State University. Along with enjoying his teaching and research, he recently became a co-special publications editor for the Paleontological Society.

Bruce A. Johnson, B.S. 79, has been with Texaco since 1979 and is currently director of quality with Texaco E & P Inc. in New Orleans. He and his wife, Ann, welcomed the birth of their daughter, Julia, in October 1993. She joins her 2-year-old brother Russell.

EIGHTIES

Grant Olson, B.S. 81, is now in large animal veterinary practice at Peninsula Veterinary Service in Sturgeon Bay, Wis., where he performs basically dairy medicine and surgery as well as some horse, sheep, goat and beef work. He's glad to be out of the small animal

setting and back in "the great outdoors in beautiful Door County, Wis."

Alan Woodland, B.S. 81, was recently conducting research in experimental petrology at the Bayerisches Geoinstitut in Bayreuth, Germany, and wife **Sarah Volungis Woodland, B.S. 81**, is working part time for an American environmental consulting firm in Germany on cooperative projects.

After three years in Bayreuth, however, they are moving on. Alan has just started a five-year position at the University of Heidelberg in the mineralogy and petrography department. Sarah is continuing her work from Heidelberg since she is the company's representative in Germany.

The couple do a lot of hiking and visit local breweries, "which is a full-time job in itself in northern Bavaria!" Sarah writes.

Sharon Geil, B.S. 82, manages cleanup of hazardous waste sites at AMC bases across the country as part of the U.S. Air Force at HQ Air Mobility Command. She is primarily responsible for Dover AFB, Del., environmental education for the Command and ensuring the existence of adequate community relations programs Commandwide. The restoration work she began last year of an overused pasture to native prairie is coming along, she reports, and is expected to yield a decent crop of grass this year. She lives in Smithton, Ill.

Paul V. Heinrich, M.S. 82, is a Quaternary geologist and sedimentologist for the Louisiana Geological Survey in Baton Rouge, doing mapping and other research concerning the Pleistocene strata of Louisiana, geologic hazards and environmental concerns.

Jaymee Delaney Soldevilla, B.S. 83, received her M.D. in June from Oregon Health Sciences University. She is now an internal medicine resident at Good Samaritan Hospital for the next three years. She and her husband, Francisco,

have a daughter, Kirstin (6), and a son, Francisco (2 1/2), and live in Portland.

Stephen Laubach, M.S. 83, Ph.D. 86, was the co-chairman of the first North American Rock Mechanics Symposium that was held in June in Austin, Texas.

Jim Klima, B.S. 88, is a geophysicist with Conoco, Inc., in Corpus Christi, Texas, at its Onshore Gulf Coast Division. He is currently exploring for and developing Oligocene Frio and Eocene Yegua oil and gas reserves. His work involves AVO analysis (Amplitude variation with offset), sequence stratigraphy and seismic color attribute analysis.

Klima; his wife, Jan, and their dogs, Hobbes and Blizzard, are still trying to get used to the heat after moving to Texas in 1992.

NINETIES

Richard D. Poskin, B.S. 91, is a graduate assistant in the zoology department at Eastern Illinois University. He recently received a grant from the Philip W. Smith Memorial Fund (along with Edward O. Moll) Illinois Natural History Survey to study the systematics of the False map turtle in Illinois. He also was inducted into the Beta Pi chapter of the Phi Sigma Biological Honor Society.

Steve Hageman, M.S. 88, Ph.D. 92, has a three-year postdoc position in the geology department at the University of Adelaide in South Australia. He is studying the contribution of Modern and Tertiary Bryozoa to cool water carbonate formation. His e-mail address is shageman@geology.adelaide.edu.au.

Mary Ann Glennon, Ph.D. 94, and husband Dan Van Roosendaal, M.S. 91 (civil eng.), welcomed the birth of their son, John William on March 8, 1994. The family lives in Woodridge.

Please take a few moments to let us and your class mates know what you've been doing: promotions, publications, election to office, marriages, parenthood, moving, awards. We'd all like to hear from you!

Name _____ Response date _____

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(indicate if changed)

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E-mail address _____

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