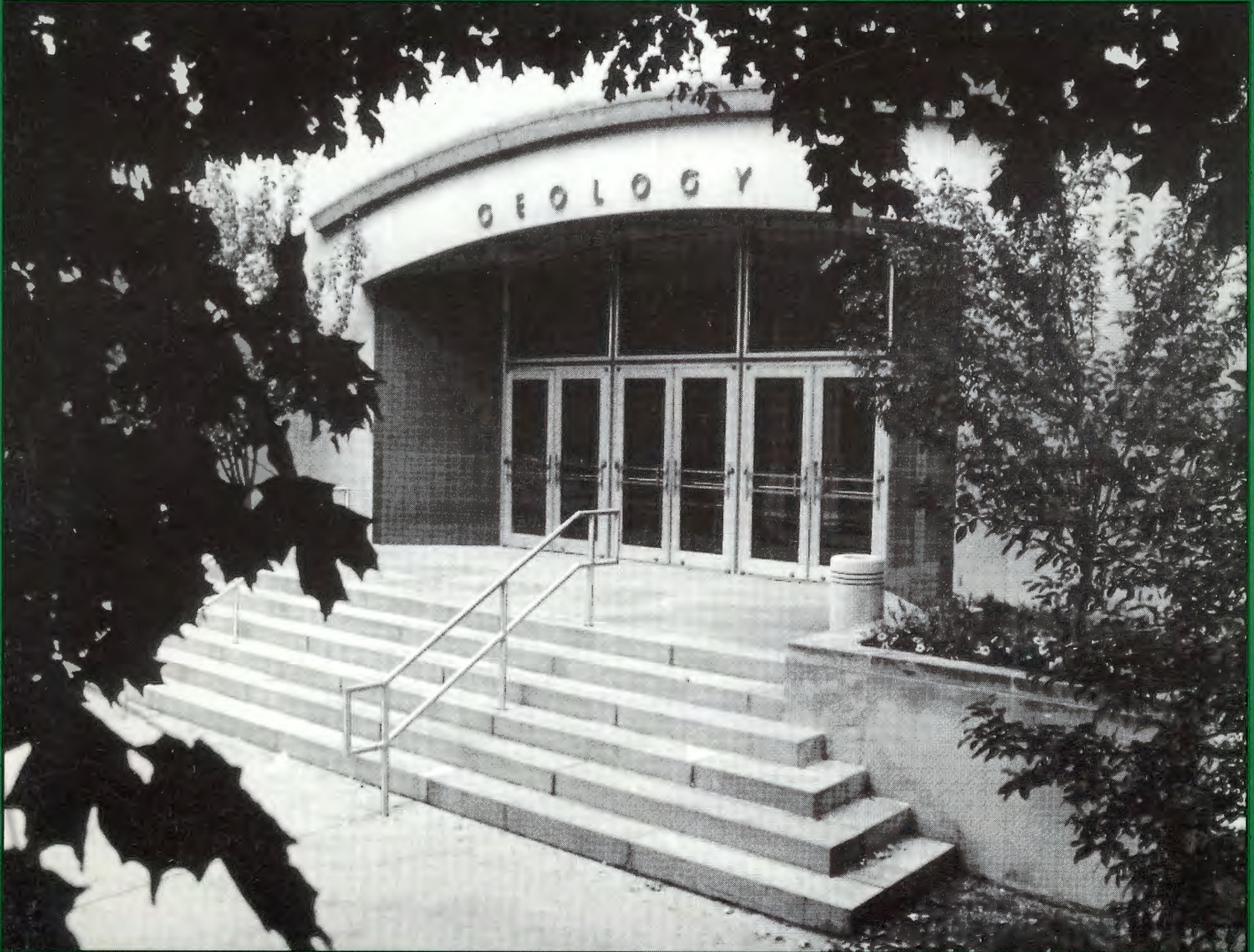


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Indiana University College of Arts & Sciences Alumni Association

HOOSIER GEOLOGIC RECORD

Alumni Newsletter of the Department of Geological Sciences



Winter 1998

HOOSIER GEOLOGIC RECORD

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Editor's note: We urge alumni and friends to send us prints, photos, or slides that would interest our readers. Please be sure to provide a complete caption and label the material with your name and address so that it can be returned. We can't promise to include all submissions, but we can promise to return yours.

Good news vs. bad news: 8-0

Greetings to you from Bloomington. The Department's commitment to move to the forefront in geoscience education and research has resulted in much good news that I am pleased to share with you.

1. *Credit hours being taught and number of undergraduate majors in the Department are up 12 percent and 30 percent, respectively, since last fall.*

2. *Tracks in geophysics and environmental geology have essentially been approved by the faculty to be added to our undergraduate degree program.*

3. *Expansion of our curriculum of environmental courses taught in the field has come about with the addition of a new Bloomington-based hydrogeology course and the introduction of a 300-level environmental science course at the Field Station.*

4. *The new tier-concept of our graduate curriculum which was described in last year's newsletter has been fully implemented.*

5. *External research funding attracted by our faculty has increased five percent in the past three years in spite of a 22 percent reduction in size of our faculty in the same period.*

6. *Computational and analytical facilities are being enhanced with the creation of a new UNIX workstation laboratory and the expected addition of major new instrumentation in the biogeochemistry laboratories.*

7. *The foundation for the Department's \$5 million endowment campaign is essentially established thanks to several major contributions. Official announcement and kickoff of the campaign is expected next fall.*

8. *Authorization has been given us to begin an outside search for a new chairperson and an entry-level faculty member in biogeochemistry. This is a strong vote of confidence from the administration because only 20 new faculty lines will be added throughout the College next year following a freeze on hiring in 1997.*

Support, involvement, and generosity of our alumni have played a significant role in making this good news possible. Receptions in Indiana, California, Colorado, Texas, and Utah have permitted me to visit with many of these alumni and to see first-hand evidence of their loyalty to the Department. This experience has been rewarding and satisfying. Next year's meeting of the Department's Advisory Board will take place in New Harmony. We will use this as an opportunity for a social function for our Indiana, Kentucky, and Illinois alumni. A close and warm association with our alumni will be an important ingredient of our future success. I hope that you remain an active part of this association.

My resignation as associate dean of the College has been accepted, permitting me to devote full time to the Department during my last year as chair. During this last year, I intend to play a strong role in ensuring that the process used to select my successor goes smoothly. I am also committed to having in place sufficient basis for official announcement of the Department's endowment campaign in fall 1998. An endowment of the magnitude we hope to create will have an enormous lasting impact on the Department. For this reason, the campaign must succeed and for this to happen we will need your support.

Best wishes for a peaceful holiday season — one that brings to you abundant warmth and good feelings.

— Lee Suttner

Plan a Unique Vacation Now!



Do you long to relive your student days as a geology major? Then take a week's vacation at the IU Geologic Field Station and revisit the sights and scenes of yesteryear! Join fellow IU alumni and friends at the Geology Alumni College.

- The 1998 alumni college is being held on Aug. 22-29.
- Your expert faculty are professors Gary Lane (IU) and Tom Straw (Western Michigan).
- Refresh your memory of the geology, flora, and mining activities of the Tobacco Root Mountains with daily field trips.
- Optional: Tour Yellowstone or camp overnight at a glacial lake.
- All meals are provided, and accommodations are the rustic cabins you remember so "fondly."

- For details contact Professor Gary Lane: phone: (812) 855-7994 or (812) 339-2772; fax: (812) 855-7899; e-mail: gsac@indiana.edu
- See pages 9 and 21 for more about the IU Geologic Field Station.

Bookmark our Web page: www.indiana.edu/~gsac

Departmental news

Pleasant growing pains

Growth continues in undergraduate course enrollments. In order to improve its reputation for teaching rigorous service courses, in 1991-92 the Department made a fundamental change in its philosophy of teaching courses at the 100-level. The high-enrollment (600 per semester) large-lecture course in physical geology was downsized and supplemented with a variety of smaller enrollment (75-100) courses with a more topical focus. This caused an initial drop in number of credit hours taught by the Department, but since a low in 1992-93 there has been a steady gain, contrary to every other science department in the College. For the past three years, the Department has seen a 75 percent occupancy in the 10-11 sections of 100-level courses offered. Credit hours taught during fall 1997 rose 12 percent from the previous fall semester. Along with this and previous increases in undergraduate enrollment, the number of undergraduate majors in the Department has risen from a low count in the 30s in 1991-92 to a high in the 60s today. Continued growth in majors is expected in response to the increased recruiting by the oil and gas industry though there is concern about reports suggesting a reduction in employment in environmental geoscience and its possible effect on our programs in that area.

During the 1996-97 academic year, the faculty was immersed in developing changes in both the undergraduate and graduate curricula and degree requirements. At the undergraduate level, the faculty approved the concept of "tracks" (general geology, geophysics, and environmental geology) in both the BS and BA degrees. The issue of specific course work in mineralogy and petrology should be resolved soon. The tier-concept of graduate level courses (discussed in the previous newsletter) has been approved and is being phased into the program.

Awards and honors

Two Richard Owen Awards honoring graduates of the Department who have distinguished themselves in industry/government or academia were awarded in 1997.

The first recipient was **Malcolm W. Boyce**, MA'56, retired exploration vice president for Chevron Overseas Petroleum Inc., and the second was **Lawrence**



OCTOBER 1959: Early preparations for the Department of Geology's move from Owen Hall to 10th Street in Bloomington.

A. Taylor, BS'61, MA'63, professor of geological sciences, University of Tennessee at Knoxville.

Malcolm Boyce began a long and distinguished career with Chevron in 1956 immediately after receiving his MA degree from IU. From then until 1968 he was in domestic exploration, assigned in west Texas, Houston, and Oklahoma City. From 1968 to 1971, he was with Chevron, San Francisco, as an exploration geologist for Africa. He served as North Sea exploration manager for Chevron Oil Co. of The Netherlands from 1971 to 1976 and as exploration manager for Europe of Chevron Overseas from 1976 to 1984. From 1984 until his retirement in August 1994, Mal was vice president exploration, Chevron Overseas, San Ramon, Calif. At the time of his retirement, he was responsible for overseeing Chevron Overseas operations in Angola, Congo, Nigeria, and Papua, New Guinea, among others. Mal has been active over the years in AAPG and has been especially instrumental in the active role of the IU Geological Sciences Advisory Board in promoting long range planning and development of the Department. He currently serves as president of the Advisory Board. His Richard Owen Lecture to the Department

colloquium on Oct. 6 was titled *Change, Instant Replay, and Fast Forward*.

Lawrence Taylor began his academic career as an IU undergraduate, receiving the BS degree in geology in 1961. Following receipt of the MS degree, also from the Department, Larry moved to Lehigh University for doctoral study in geological sciences with a minor in material sciences. From 1968 to 1970 he served as postdoctoral research fellow, Geophysical Laboratory, Carnegie Institution of Washington, D.C. During 1970-71, he held Fulbright and Humboldt postdoctoral fellowships at the Max Planck Institute für Kernphysik, Heidelberg, Germany. After spending 1971-73 at Purdue University, West Lafayette, as an assistant professor, Larry moved to Knoxville, Tenn., initially as an associate professor and then becoming full professor in 1977. His teaching and research have been in the areas of geochemistry, petrology, and mineralogy of both extra-terrestrial (the Moon and meteorites) and terrestrial rocks (the Earth's mantle). His research group has discovered and dated lunar mare basalts more than 4.2 billion years in age, necessitating significant changes in theory concerning the timing of volcanic activity and evolution of the Moon. Their theory



Chancellor Herman B Wells congratulates Abhijit Basu, left, during a reception honoring Basu upon his receipt of the Distinguished Service Award from IU.

for a process of effective geochemical separation of a group of elements by silicate liquid immiscibility has greatly simplified the modeling of basalt petrogenesis. His terrestrial studies are focused on the chemical and physical nature of the Earth's mantle through investigations of kimberlites and related intrusives, the source rock for diamonds formed deep (150-200 km) within the Earth. His studies of eclogite inclusions in African kimberlites bear directly on the formation of the Earth's crust and continental cores. He is the author or co-author of some 247 professional papers, 262 extended abstracts, and 117 abstracts of papers presented at professional meetings. His total of external research grant funds received while at the University of Tennessee (mostly from NASA, but also NSF) exceeds \$4 million, and his list of professional service on program committees, panels, and editorships is long. At the Oct. 16, Department colloquium, Taylor presented his Richard Owen Lecture, titled *Kimberlites As Windows into the Mantle:*

An Unexpected Origin for Diamonds.

Abhijit Basu received one of just two Distinguished Service Awards for Indiana University Bloomington at a reception and program, held on April 22 at the University Club of the Indiana Memorial Union. After welcoming remarks by Vice President for Academic Affairs and Chancellor of the Bloomington Campus **Kenneth R. R. Gros Louis** and words about the award and introduction of nominators by Vice Chancellor for Academic Affairs **Deborah A. Freund**, Basu was introduced by Professor **Lee J. Suttner**, chair of the Department of Geological Sciences. Basu's nominator, the venerable **Henry H.H. Remak**, professor emeritus of Germanic studies, comparative literature, and West European studies emphasized not only the quality and quantity of Basu's service to IU, but also the selflessness and integrity with which he has performed so many deeds. The diversity of his service contributions includes the India Studies Program, Honors Division, Wells Scholar Program, the Institute for Advanced Stud-

ies, the Multidisciplinary Seminar Program Committee, the Judicial Review Board, and Sigma Xi. He played a crucial role in raising a significant part of the funding required to establish the India Studies Professorship at IU. In addition to his service to IU, Basu has an outstanding record of professional service and is associate editor of the *Journal of Sedimentary Geology* and science editor for *Geological Society of America Books*. He is a prolific reviewer of scientific manuscripts and research grants, has served on numerous committees of the Society for Sedimentary Geology, was president of the Great Lakes Section of SEPM, and has been in charge of SEPM's program that sends books to foreign libraries.

Erle Kauffman was recently honored by the announcement that he is to be the recipient of the 1998 Twenhofel Medal. The Society for Sedimentary Geology presented this medal to Erle during an awards ceremony on June 4 in Calgary, Alberta. The medal was given for "outstanding contributions and sustained excellence in the field of sedimentary geology." Erle accepted the medal, the second of his career, with heartfelt appreciation and a multitude of thanks to his mentors, colleagues, and students for providing stimulating discussions through the many years of his career. This award follows his receipt of the 1997 Gilbert Harris Award of the Paleontological Research Institution, which is given annually to an individual who has achieved lifetime excellence in systematic paleontology. This award was presented at the Friends of PRI reception, held in conjunction with the GSA annual national meeting in Salt Lake City on Oct. 21.

Lisa Pratt was honored at the October GSA Meeting in Salt Lake City by the receipt of the 1997 Association for Women Geoscientists Outstanding Educator Award, presented by the AWG Foundation. In the newsletter published for the meeting, Janet Bauder Thornburg described Pratt as an enthusiastic, innovative educator who imparts her knowledge with clarity and insight, and has, for example, developed a successful introductory geology course that includes many hands-on experiments, provocative group discussions, writing exercises, and an emphasis on current global issues and multidisciplinary problem solving. She draws the best efforts from her graduate students by promoting independence. She currently supervises four PhD students and two MS candidates. Her pre-

(continued on page 4)

Come visit our World Wide Web pages

- Department of Geological Sciences: <http://www.geology.indiana.edu>
- Geologic Field Station: http://www.geology.indiana.edu/field_station.html
 - Laboratories: <http://www.geology.indiana.edu/labs.html>
 - Geology Library: <http://www.indiana.edu/~libgeol/index.html>
- Mailboxes and home pages: <http://www.geology.indiana.edu/folks.html>
 - Indiana Geological Survey: <http://www.indiana.edu/~igs/>

Departmental news

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vious graduate students and postdoctoral associates have established successful careers in academia, industry, and government.

In addition to the AWG award, Lisa Pratt has been honored by the award of a Gill Fellowship from the College of Arts and Sciences beginning with the 1997–98 academic year. Gill Fellows are faculty whose excellent teaching and research make them possible targets of other universities. Each Gill Fellow receives \$10,000 per year for four years. Funds may be used for salary topoffs, research, travel, and equipment, including graduate student funding and other requirements of a first-class scholar.

Keller Clay Collection

Walter Keller of the University of Missouri has donated what is probably the largest collection of clays from around the world to Indiana University. In July, **Haydn Murray** arranged the transportation of this collection of described clay specimens, along with hundreds of electron micrographs to Bloomington. The combination of the Keller collection along with Murray's own extensive group of samples will produce a collection at IU that will be the most outstanding and extensive compilation of clay samples in the world.

Happenings in Geophysics

Over the past couple of years, the geophysics group has added to its list of far-flung field studies an interesting new field area right in our own backyard. Faculty, students, and postdocs have embarked on a new, comprehensive geophysical study of one of the world's major intracratonic basins — the Illinois basin. A major component of this interdisciplinary study is a three-year project on the seismicity of the southern Illinois basin. The work has been supported by three major grants from the U.S. Geological Survey's National Earthquake Hazards Reduction Program totaling \$125,000 (principal investigators: Rudman, Pavlis, Hamburger, and former research associate Haydar Al-Shukri). The primary focus of this work has been on an area of poorly understood seismicity that extends northward from the New Madrid seismic zone into southwestern Indiana and southeastern Illinois. This belt of seismicity, known as the Wabash Valley Seismic Zone, has been the focus of increasing attention from the perspective of earthquake hazards in the central

United States.

The historical record of seismicity in this area shows only a diffuse scattering of moderate-sized earthquakes over the last 30 years (the largest was the magnitude 5.5 event of 1968 centered near Carbondale, Ill.). IU archaeologists **Pat** and **Cheryl Munson**, working together with geologists from the USGS and Indiana Geological Survey, have uncovered evidence for hundreds of paleoliquefaction features, which provide evidence for repeated prehistoric earthquakes with magnitudes greater than 6.5 over the last 10,000 years. These findings, combined with new work on the basement structure of the Illinois basin, have resulted in a renewed interest in the tectonics and potential earthquake hazard in the southern Illinois basin.

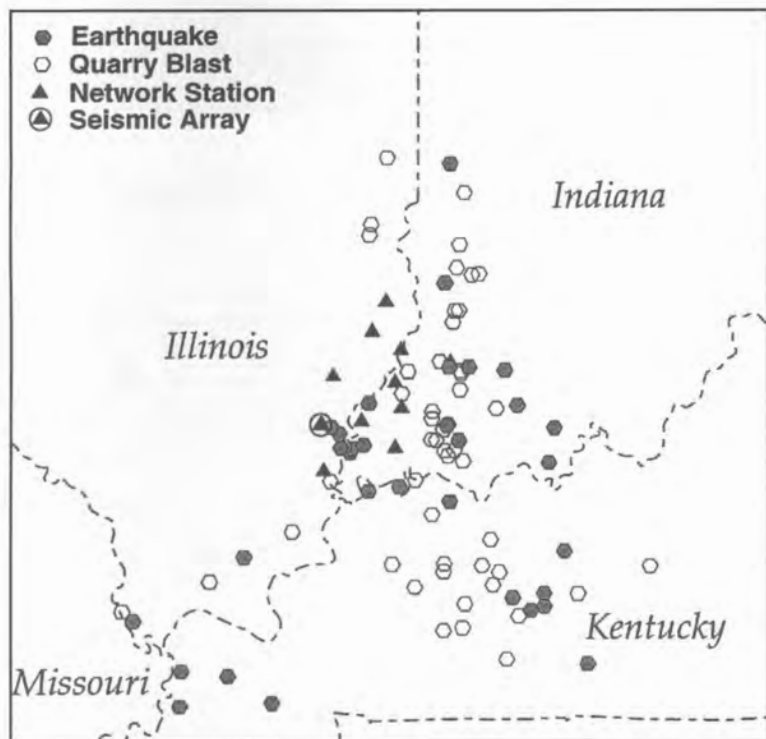
A major field effort has included deployment of 20 state-of-the-art three-component digital seismographs in late 1995 and 1996 for a seven-month field experiment (see map). Ten of the instruments were placed in a small array over a one-kilometer radius and operated continuously, sampling at 40 samples per section. This seismic array deployment, originally developed for nuclear monitoring studies, provides a means to enhance the signal-to-noise ratio of tiny events that are too small to be otherwise recorded by individual seismograph stations. Ten more instruments were deployed in a network over a 100 x 60 km area along either side of the Wabash River. The network instruments did not operate continuously, but were triggered by incoming events and then recorded at 250 sps. The experiment resulted in an extraordinary data set of more than 140 gigabytes of digital seismic data. Presently, the geophysics group, aided by graduate students **Brian Pope**, **Glen Bear**, and **Yuming Fei** and undergraduate **Bob Reuss**, are undertaking the yeoman task of analyzing this enormous data set. Initial analysis indicates that there are about 20 events per day (17 quarry/mine blasts, two teleseisms, and one "local" event). The preliminary locations, determined by a new seismic array location algorithm developed by **Gary Pavlis**, indicate that the local events originate both from the New Madrid seismic zone and from the vicinity of the Wabash Valley fault zone of southern Indiana and Illinois.

Two other related studies on the Illinois basin are in progress. **Glenn Bear**, under the supervision of **Al Rudman** and **John Rupp** (IGS) is completing a PhD research project on the nature of

the Wabash Valley fault system. Using previously unavailable seismic reflection profiles and new gravity and magnetic data, Bear has examined the basement structure beneath the Wabash Valley zone. He has convincingly demonstrated that the faults observed at the surface extend to depths of seven km. or more and are therefore potentially linked to observed low-level seismicity in the area.

A second study, also supported by the USGS Earthquake Hazards Program (**Michael Hamburger**, principal investigator), involves monitoring of active movements of the Earth's crust in the Illinois basin using the newly developing technology of satellite geodesy. The Global Positioning System, originally developed for military navigation, can be used to generate extraordinarily precise geodetic measurements — now measured in millimeters — over distances of hundreds of kilometers. Hamburger, together with **Glenn Bear**, postdoctoral associate **Tony Lowry**, geophysics technician **Terry Stigall**, and **John Rupp** (IGS), established a new network of 56 permanent geodetic benchmarks (see figure) in the Illinois basin and surrounding areas of southern Indiana and Illinois and western Kentucky. In an intensive field experiment, Hamburger and Lowry, aided by a small army of IU graduate students, made round-the-clock measurements at all 56 sites using IU's own network of GPS receivers. Data from this first experiment are currently being analyzed, and measurements will be repeated next year; any differences from this year's measurement campaign will provide the first direct measure of contemporary strain in the Illinois basin.

In an exciting nonlocal field project during July–August, **Gary Pavlis** and **Terry Stigall** were involved in field work to install seismic stations for the new Incorporated Research Institutions for Seismology broadband array in northwestern Colorado (see figure). Pavlis has been co-principal investigator on this project for the past two years with **Frank Vernon** of Scripps Institute of Oceanography, and this experiment is the first major field test of the new system. The broadband array uses low-power digital radios utilizing newly-introduced spread-spectrum radios in the 900–1,000 Mhz band to transmit data from IRIS-PASSCAL portable dataloggers to a central receiving site — in this case, Lookout Mountain, northwest of Craig, Colo. Here the data are recorded on a Sun workstation using a revolutionary new real-time software system developed at the University of Colorado. This com-



SEVEN MONTHS IN THE FIELD: Map of earthquakes and mining explosions recorded by IU's Wabash Valley Seismic Network from late 1995 and 1996.



DIGGING IT: Mike Hamburger drills a hole for a geodetic benchmark used in the Wabash Valley.

puter communicates with a TCP/IP connection to a machine at the University of Colorado via a dedicated line using a mix of special hardware from the array and commercially supplied dedicated lines. From Boulder, other people involved in the project are able to access the data from the array in real-time. Here at IU, geophysicists routinely receive all the data from the 33 stations of the array (99 channels) at 40 samples per section with a total latency of only about 30 seconds. The state-of-the-art digital communications technology used in this new system is likely to become the standard for seismic recording in earthquake research for the next decade or more.

During last spring, the geophysics group welcomed a new member, **Anthony Lowry**. Tony, who received his PhD degree from the University of Utah, came to IU following a postdoctoral position at Victoria University, Wellington, New Zealand. He brings to the geophysics group a research emphasis on the geodynamics of continental interiors, applying methods of potential field geophysics, geodynamic modeling, and satellite geodesy to understand mechanisms of present-day deformation. Also welcomed were four new geophysics graduate students. PhD student **Vladimir Rybakov** comes from Bowling Green State University with an un-

usually broad background, including oceanography, structural geology — and Russian heavy metal rock 'n roll! **Yuming Fei** joins the geophysics PhD program after receiving an IU master's degree in

hydrogeology. He seeks to combine these two degrees with a second master's in computer science. **Cathy Thibault**

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INSTALLATION CREW FOR THE IRIS BROADBAND ARRAY: Scene is on the porch of the Old Victory Hotel in Maybell, Colo. Personnel are from Scripps Institute of Oceanography, University of Colorado, and Indiana University. Terry Stigall and Gary Pavlis, both of IU, are on the far right, holding tools of the trade.

Departmental news

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comes from Denison University and brings the geophysics group a background in planetary science, having completed an impressive NASA-supported undergraduate research project on the geology of asteroids. **Brent Foshee**, from the University of Southern Alabama has a strong background in structural geology.

Soccer and geology at IU

A connection between the Department of Geological Sciences (then Geology), the Indiana Geological Survey, and the roots of the IU soccer program was noted in a July 6, 1997, *Bloomington Herald Times* article by writer Andy Graham. To date, IU has won three NCAA titles, made 10 Final Four appearances, and established a record 46-game unbeaten streak under the direction of Coach Jerry Yeagley — all since soccer became a varsity sport under Yeagley in 1972. As this newsletter goes to press, this year's team has just completed an unbeaten season (18-0) and is ranked number one in the nation. The seeds of IU soccer, however, were planted by **Gottfried K. "Joe" Gunnel**, who established and coached soccer as a club sport at IU from 1949 to 1960. Joe was born in Germany, played there as a youth, and moved with his family to Pennsylvania at the age of 13, where he finished high school. He then moved to Indianapolis, where he attended Butler University, receiving a BA degree in 1943. After serving the U.S. in Europe during World War II, he returned to Butler and received an MS in botany in 1949. He was offered a fellowship for PhD study at the University of Illinois, but this did not happen when **Charles Deiss**, chair of the Department of Geology at IU and director of the Indiana Geological Survey, came to Indy and talked to Gunnel. It seems that Joe had done pollen studies on two bogs in northern Indiana, and Deiss was looking for someone to start a

pollen lab at the Geological Survey. Deiss convinced Gunnel to turn down the fellowship, work for the Geological Survey, and earn his PhD at IU. It took him 10 years to earn the degree, but in the meantime Joe was instrumental in forming and then coaching the Indiana Soccer Club. Under his tutelage, he had six all-Americans, won one national championship (1955), and won one co-national championship (1959) during a period when there was no national tournament. After leaving IU in 1960, Gunnel moved to Colorado, where he established a youth soccer program that reached 45,000 kids and became a charter member of the Colorado Soccer Hall of Fame. He still lives in Colorado and is honored at IU by the Joe Gunnel Award, which is presented annually to IU's most valuable soccer player.

Departmental changes

Several changes in personnel in the Department have occurred in the past year. **Michael Savarese** is now an associate professor at Florida Gulf Coast University in Fort Myers, Fla., as well as a research scientist at the Rookery Bay National Estuarine Research Reserve in Naples, Fla.

Randy Mackie has moved to the San Francisco area and is research manager at GSY-USA Inc., which is a geophysical research and services company formed in early 1997 by Randy and colleagues in Europe from Geosystem, which is headquartered in Milan, Italy, and has a branch office in England. Geosystem is primarily a geophysical services company that specializes in resource exploration using magnetotellurics, time-domain EM, and microseismic studies. Randy is involved with both research and applied projects. He continues to work on research projects on Pakistan tectonics, upper mantle conductivity, and the San Andreas Fault.

Mark Gilstrap, after serving the Department as analytical chemist and computer systems support provider has left IU to accept a position in Tulsa, Okla. **Paul Blanchon**, a postdoctoral researcher from the University of Alberta joined the Department in November 1996. Paul joins **Claudia Johnson** and others working on issues pertinent to reefs and global change, both for the past and as predictive tools for the future. The approach to this research is from both sedimentologic and paleobiologic perspectives.

The Department lost two of its most distinguished emeriti professors during the past year: **Warren G. Meinschein** and **Robert H. Shaver**.

In memoriam

Warren G. Meinschein 1920-1997

Warren G. Meinschein, professor emeritus of geology and SP&EA, and former associate dean for academic affairs in the School of Public and Environmental affairs, died in Nashville, Tenn., on Feb. 7, 1997. He leaves a scientific legacy that earned him worldwide recognition as founder and forefront researcher in the field of organic geochemistry.

Born on Nov. 12, 1920, in Slaughter, Ky., Warren was the son of Tim and Carrie (Poole) Meinschein and a 1938 graduate of Central City, Kentucky, High School. From 1938 to 1940, he was enrolled at Indiana University but war intervened, and, from 1940 to 1946, he was a member of the U.S. Navy. It was during this global conflict that he met and married Mary Elizabeth (Williams). Warren served in both the Atlantic and Pacific theaters, and at the time of discharge held the rank of lieutenant commander. Perhaps his most memorable activity entailed service as deck officer on a naval vessel that escorted slow-moving convoys of cargo ships through icy waters of the North Sea and Arctic Ocean on the deadly run to Murmansk, Russia.

Upon returning to civilian life, Warren entered the University of Michigan, where, in 1948, he earned the BS degree (with distinction) in chemistry. That same year, he entered the University of Texas graduate program, where he was Sun Oil Fellow, and where he completed work for the doctorate in 1951, with specialization in organic chemistry, physical chemistry, and mathematics.

The early part of Warren's professional career was spent conducting organic geochemical research for the petroleum industry, first at the Socony-Mobil Research Laboratories in Dallas (1951-1958) and then, (1958-65) as research associate of the Esso Research and Engineering Laboratories in Linden, N.J. During these years, Warren was co-developer of the methane proportional counter method of Carbon-14 dating and co-discoverer of evidence of organic matter in meteorites. He was also involved in developing a theory for the origin of petroleum, and propounded the theory that molecular products of





Warren G. Meinschein

former life, i.e., "molecular fossils," survive as compounds known as alkanes and aromatic hydrocarbons.

In 1966, Warren joined the IU faculty as professor of geochemistry, and founded what was to become one of the country's first academic and research programs in organic geochemistry. Warren G. Meinschein was the expert who, in the 1960s, advised NASA on the plans for sampling and analyzing Moon rocks in search of extraterrestrial life. Equipping his laboratory with a highly refined mass spectrometer system, Warren and his team of able graduate students analyzed the first samples brought back from the Moon, finding therein no evidence that life has existed on that satellite. Other research entailed further investigations into the origin of petroleum, the destructive distillation of oil shale, pollutants in the Bloomington watershed, and analysis of "molecular fossils." Warren compiled a voluminous record of his pioneering interdisciplinary research, including more than 70 titles, which embrace published articles, technical reports, abstracts, and book reviews. Many of his works have become classics, and he has left us with a most impressive scientific legacy. Always mindful of the need to recognize the contributions of his students and co-workers, Warren seldom chose first authorship of work that had resulted from a team effort.

In 1975, Warren was appointed associate dean for academic affairs in the School of Public and Environmental Affairs. He served five years in that assignment before returning to his first loves, teaching and research. When he joined SPEA, the school was only four years old and its academic programs were still

maturing, although growing rapidly. Warren made an enormous contribution to the quality of its academic programs and was particularly instrumental in building the environmental science component of SPEA. He did this by careful attention to the intellectual content of the still new environmental field and by recruiting several key additions to SPEA's environmental faculty.

Aside from his landmark scientific and academic achievements, Warren was a most affable and helpful colleague, a strong and purposeful leader, a supportive administrator and a warm and genuine friend. He played an active role in the social life of both the Department of Geology and in the School of Public and Environmental Affairs. Together with his wife, he charmed us with his generous hospitality, wit, and consummate congeniality. In retirement, Warren especially enjoyed growing roses; pursuing his intensely competitive instincts in bridge, golf, and tennis; preparing a variety of ethnic foods from his own original recipes; and devoting time to his expanding family. He is survived by his wife, Mary; daughter Sherra E. Kerns; sons Warren Meinschein Jr. and Timothy A. Meinschein; six grandchildren; and two great grandchildren. It is to all of them that we dedicate this memorial resolution.

— Prepared by professors Abhijit Basu, Charles F. Bonser, Donald E. Hattin, N. Gary Lane, J.C. Randolph, and Charles R. Wise. It was read into the Bloomington Faculty Council minutes.)

Robert H. Shaver 1922–1997

Robert H. Shaver, professor emeritus of geology, died unexpectedly on Sunday, Sept. 14, 1997. As a fitting end to his illustrious and remarkably productive career, Bob had just returned from a four-day field trip to the northern Indiana Silurian outcrop of which he was the acknowledged doyen.

His career was distinguished especially by extensive service to the profession and a record of published research that set a standard of excellence for interpretation of Midwestern geologic history. Bob was a master of organization, the widespread recognition of which placed him repeatedly in leadership roles at local, state, and national levels. As a teacher and advisor, Bob was meticulous, thorough, and demanding, but always fair and understanding, and he touched de-

veloping minds with artful grace. In all areas of endeavor — teaching, research, and service — he made lasting contributions to our profession.

Bob Shaver was born in North Henderson, Ill., on Sept. 8, 1922, and received his early schooling in a conservative Midwestern atmosphere that imbued him with a true love of humanity and deep concern for his colleagues, students, and friends. In 1940, he embarked on a college career that was cut short by the outbreak of World War II. By November 1942, he had joined the U.S. Army Air Corps and signed up for navigational training at a time when many Air Corps volunteers aspired to become pilots. Because of exceptional skill as a radar navigator, Bob was selected as lead navigator on numerous major bombing missions over Nazi Germany, including those on Hamburg and Bitberg. In 1945, Bob returned to the U.S. with his English bride, Beryl Burt Shaver, and left the Air Force as a first lieutenant. In recognition of his wartime heroism, a grateful nation awarded Bob the Air Medal with two Oak Leaf Clusters and the Distinguished Flying Cross, which were the first of many honors that he would earn. In 1946, Bob reentered college, this time at the University of Illinois, where he received the BS, MS, and PhD degrees in geology in 1947, 1949, and 1951, respectively. From 1951 through 1956, he was affiliated with the Department of Geology, University of Mississippi, where he rose from assistant professor to professor and departmental chairman. In 1956, he accepted a joint appointment as head of the Geology Section, Indiana Geological Survey, and associate professor in the IU Department of Geology. In the former capacity, he served with distinction through 1986, and then served as head of the newly created Research and Project Development Branch until his retirement in December 1987.

In the Department, Bob played a vital role in teaching at all levels, with major emphasis in introductory paleontology and micropaleontology. Despite a heavy commitment to research and administrative work in the Geological Survey, he directed the research of numerous graduate students whose record of professional achievement is ample testimony to his uncompromising insistence upon excellence.

As a paleontologist, Bob had already established a substantial reputation when, in the mid-1960s, he turned attention to complex problems associated with mid-

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In memoriam

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Paleozoic stratigraphy of the Michigan Basin. This shift of emphasis has had a profound effect on contemporary thought regarding relationships between basinal and adjacent platform depositional environments, the interpretation of Silurian reefal growth patterns, and paleogeography of the Eastern Interior region. Not surprisingly, his bibliography of more than 100 articles, abstracts, and books includes more than 40 items resulting from invited participation in professional activities at the state, national, and international levels. It is in the area of service to geology, however, that Bob Shaver truly excelled, and it is for his loyalty to the Department of Geology, the Indiana Geological Survey, and the profession in general that he was so greatly admired and will be long appreciated. Colleagues will recall with smiles the lengthy memoranda with which Bob reported so thoroughly and insightfully the data, deliberations, and recommendations of the many major departmental committees that he chaired. These included, among many, the Committee for Graduate Studies, Committee for Undergraduate Studies, Faculty Recruitment Committee, Departmental Faculty Committee, Geology Planning Committee, and Department Bulletin Committee. Because of his exceptional organizational skills, he was chosen chairman of the Geology Building Dedication Committee, assistant chairman of the Department (1967–1972), and acting chairman (1970 and 1976). These, to name but a few, merely hint at the extent of responsibility entrusted to Bob by a succession of five grateful chairmen over a period of 27 years. Bob was also the principal architect of successful grant proposals involving the acquisition of instructional equipment, initiation of our hydrogeology program, and landing NASA fellowships. Amongst his many commitments to the Indiana Geological Survey, his long (1960–1987) tenure as chairman of the Geologic Names Committee deserves special mention, and he was editor of *Special Report 44*, which is the principal record of the Indiana Geological Survey Sesquicentennial (1987). One need not enumerate the many other departmental, survey, and university committees on which Bob served as member or chairman — his service to the Department, Survey, and university has no parallel in modern times.

Despite the heavy burden of local commitments, Bob compiled an even more



John Droste, left, and Bob Shaver right after Bob's last field trip on Sept. 9. He died unexpectedly just a few days later.

impressive record of service to the major societies of our profession. Among the many contributions, one can mention especially his service as regional coordinator and member (1978) of the Operations Committee for the COSUNA (Correlation of Stratigraphic Units of North America) project of the American Association of Petroleum Geologists, chairman of the Field Trip Committee for the 1983 annual meeting of the Geological Society of America, and organizer for the Indiana portion of the North-Central Section Centennial Field Guide of GSA's Decade of North American Geology. Nowhere, however, have Bob's services to the profession had greater impact than in the prestigious Society of Economic Paleontologists and Mineralogists, where he served as associate editor of the *Journal of Paleontology* from 1958 to 1962 and as editor from 1964 to 1969. As chairman of the SEPM Publications Committee, he shepherded seven books to publication, serving as co-editor of two of these works. From 1972 to 1975, Bob served as vice president and then president of the Great Lakes Section, and from 1975 to 1977 was first national president-elect and then national president of SEPM. His service to SEPM extended far beyond elective office, including chairmanship of numerous major committees. For exceptional service to the society, Bob received several awards, the most impressive being election to honorary membership.

In retirement, Bob continued to publish articles on stratigraphy of the Mid-

western Basin and Arches region, especially on the Silurian of that area. He also devoted much time to genealogical research, which resulted in a four-volume compilation that documents history of several branches of his family. In the process, he established descent from Richard Warren of the Mayflower (1620) and became a member of the Mayflower Society. In 1991, he published an autobiographical work titled *To beyond the North Sea and Back, an Eighth Air Force Saga that James Michener never wrote*, and in subsequent years prepared informative, well-illustrated, and humorous accounts of the several overseas trips that he and his second wife, Sue, took to such far-flung places as Scandinavia, Russia, China, Siberia, and Ireland. In addition to his skills as writer, Bob was also a meticulous craftsman, whose outstanding woodworking is to be seen throughout his and Sue's home. Last, but hardly least, Bob worked assiduously in his English-style perennial garden, which is a marvel to behold when in full bloom, and surely ranks as one of the finest in Monroe County.

All of his diverse accomplishments aside, Bob was a truly likeable man. His attitude towards his friends and colleagues and to life in general embodied all that is good in humankind. His helpfulness, generosity, kindness, loyalty, humility, and wonderful sense of humor set him apart as a very special person. He will be greatly missed by all who knew and loved him.

— Donald E. Hattin

Geologic Field Station update

The past year has been one of both excitement and challenge for the Field Station. On the educational front, significant progress has been made toward achieving our goal of becoming a leader in the instruction of environmental field geology. G429e, the environmental option of G429, just finished its third year with every indication that things are going well and will continue to get better. **Bruce Douglas** and **Greg Olyphant** landed a \$96,000 NSF/IU grant for equipment that will significantly enhance the program. This past

year, **Paul Doss**, a professor of hydrogeology at the University of Southern Indiana and an alumnus of G429, joined the faculty in G429e. Paul replaces Greg, who has shifted his duties toward the development (from the ground floor up) of G329, a new course in environmental field sciences that will include aspects of field geology, biology, climatology, and ecology. G329 will be a required course in the bachelor of science in environmental science degree program recently approved by the university. Greg was heavily involved in the initial planning

and development of G429e and will, no doubt, use this experience to develop G329 in the same tradition as G429 and G429e. A three-week pilot version of G329 was offered last summer. Greg was joined by **Lee Suttner**, **Clara Cotten** (IU Department of Biology), and five IU undergraduate and graduate students who, together, tried to "work out the bugs" of a set of teaching modules designed during the previous fall and spring. Despite the inevitable pitfalls, the experience was definitely a success. In fact, the BSES degree program got its first

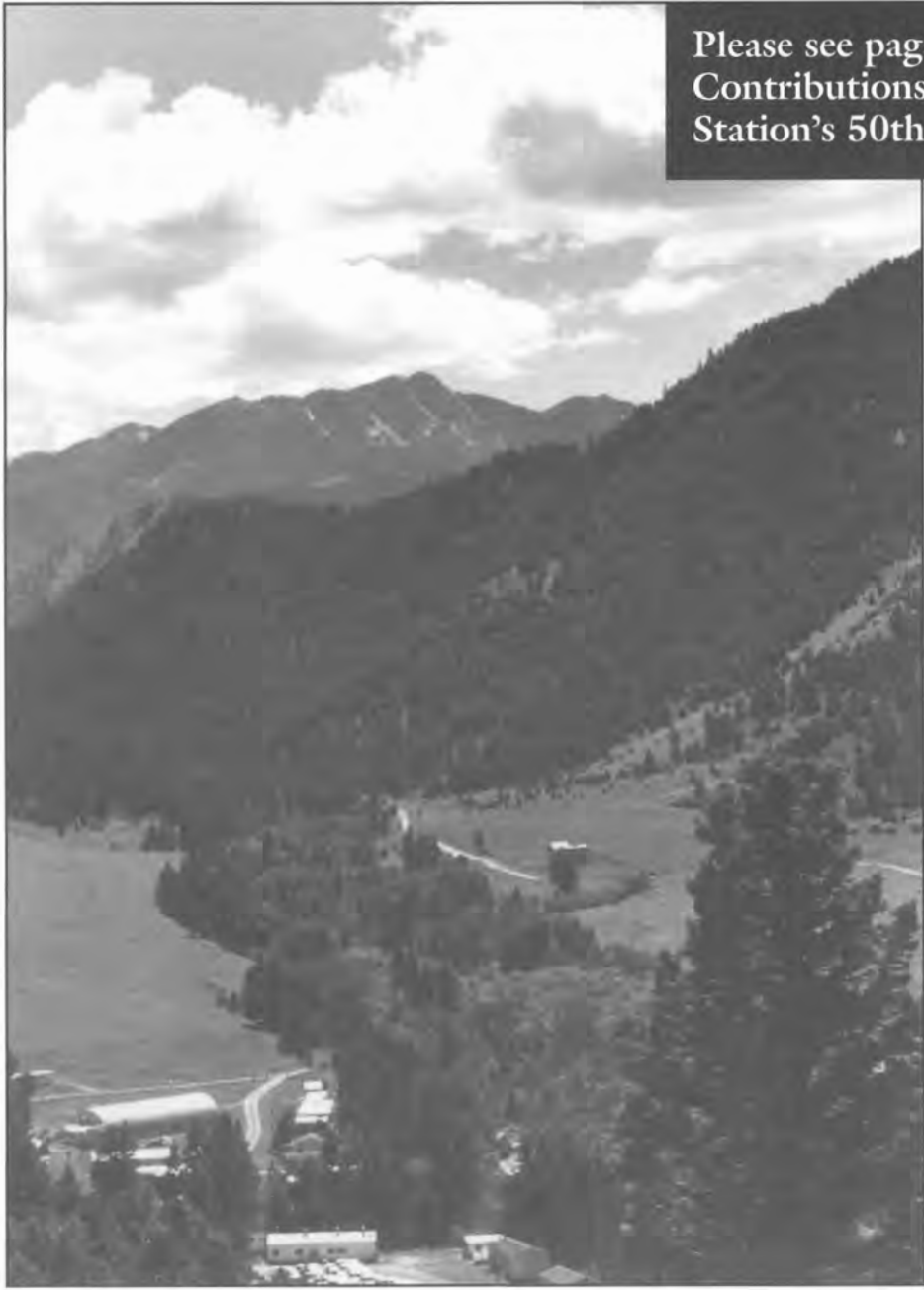
official degree candidate as a result of her involvement in the G329 pilot offering. Approval has been given by the College to offer

a full-blown version of the course in summer 1998, and we are in the process of advertising the course right now.

Total combined enrollments in G429 (our traditional course in field geology) the new G429e (environmental option), and G111-112 (our introductory course in physical and historical geology) have not fared well. Last year, I wrote of declining enrollments in these courses with confidence that the situation would turn around. Unfortunately, the enrollments dropped yet again last year (total G429/G429e enrollment of 73, G111-112 enrollment of 9). Many programs would be satisfied with these enrollment figures, but we are not. On a final note, this past year marked the end of an era in G111-112. Professor **Abhijit Basu**, who has taught the course for the past six years, decided to step down at the end of last summer. It is my belief that, during his six-year tenure, Basu's exceptional teaching has been responsible for attracting many of the brightest undergraduate majors into our program. His absence in Montana will be missed by both the Field Station and the Department.

Turning to the exciting side of things, a small contingent of Indiana University trustees visited the Field Station in late October 1996 for an impromptu "site visit." The full Board of Trustees was having a week-long meeting at the nearby Big Sky resort area (president of the

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Please see page 21: "Call for Contributions" for the Field Station's 50th anniversary.

Indiana Geological Survey update

Geologic Mapping Forum

Well-head protection, hazardous waste management, seismic risk assessment, coastal zone management, wetlands delineation and restoration, mineral resource zonation, and planning for urban/suburban expansion are all critical issues for the Great Lakes States. These issues were among those discussed at the Great Lakes Geologic Mapping Forum, held at the University Place Conference Center at IUPUI in Indianapolis on March 24.

The conference, sponsored by the Indiana, Illinois, and Ohio State Geological Surveys and the U.S. Geological Survey, was an open forum for policy-makers, developers, regulators, and educators to focus on understanding the geologic basis of environmental and economic problems through the use of geologic maps. **Harrison "Jack" Schmitt**, former Apollo astronaut and U.S. senator, who now works in the area of risk assessment, gave the keynote speech about using a set of standards for assessing risk in any capacity.

Four panels, consisting of experts in groundwater protection, groundwater modeling, geologic hazards, and land-use planning, discussed the issues. It was clear from the presentations and questions from the floor that good geologic information in a usable digital format with attendant digital data bases is absolutely necessary for public officials, industry leaders, planners, and the general public to make informed decisions. Panel members in various occupations gave myriad examples of the necessity of good geologic information depicted on maps at a scale of 1" = 2,000'.

Earthquake Hazards Workshop

Progress made in the fields of geology, engineering, and emergency management as they relate to earthquake mitigation during the 10 years since the June 10, 1987, Claremont, Ill., earthquake was the theme of a workshop with 75 attendees, held on June 12 at the Indiana Government Center in Indianapolis. The 1987 earthquake (Mb 4.9) was the strongest earthquake in the central and eastern United States since 1968 when another quake occurred 40 miles farther south. Both earthquakes took place within an active seismic region known as

the Wabash Valley Seismic Zone. While much has been learned about this zone and its potential as a source of damaging earthquakes in the future, much more remains to be learned. The purpose of the workshop was not only to present some of what has been learned, but also to foster cooperation between the private sector, government, and research communities in developing partnerships to utilize seismic information to help reduce the risk we face from future earthquakes.



The workshop, which was co-sponsored by the Indiana Geological Survey and the Indiana State Emergency Management Agency, was organized by IGS geologist **Don Eggert**, who also made a presentation, titled *Evansville, Indiana: A geological and geotechnical model soil investigation for a disaster-resistant community*. Other presentations included *The June 10, 1987 Claremont, Illinois, earthquake*, by Professor **Michael Hamburger** of the Department of Geological Sciences; *Preliminary results from the recent Wabash Valley seismic experiment*, by Professor **Gary Pavlis**, also of the Department; *Basement structures beneath the Wabash Valley Fault Zone*, by IU doctoral student **Glen Bear**; and *CUSEC State Geologists*, by IGS director and state geologist **Norm Hester**. Also, **Patrick Munson** of the IU anthropology department presented evidence of several major earthquakes centered in Indiana during the past 12,000 years. Other speakers representing SEMA, USGS,

Purdue University, the Evansville/Vanderburgh County Emergency Management Agency, the Evansville/Vanderburgh County Building Commission, and the Indiana National Guard made presentations about earthquake-related efforts at their organizations.

IGS Exhibition

The IGS hosted an exhibition of its programs and services on Nov. 5 at the Monroe County Convention Center in Bloomington. The exhibition provided an opportunity for current and potential users of the Survey's services to find out more about what the IGS is doing and what it is capable of doing for them.

It also provided a forum for the discussion of partnerships between the IGS and government, industry, and academic organizations. The exhibition included several displays illustrating themes of IGS research and capabilities. Each display was manned by IGS staff with expertise in the subject of the display. Tours of the Survey were also available.

Teacher Workshop

Rocks and minerals in modern society was the topic of a workshop for teachers conducted on June 16-18 and cosponsored by the IGS and the Indiana Mineral Aggregates Association. About 60 teachers from across Indiana participated in the workshop, which was held in Indianapolis and featured classroom and field experiences. Several of the teachers registered for graduate credit through IU and were required to submit a detailed lesson plan incorporating concepts learned at the workshop. IGS assistant director **John Hill** taught general geology and IGS geologist **Nelson Shaffer** lectured on mineral identification. John and Nelson also prepared a guidebook, including photos and text, for one of the field trips, and Nelson served as a field trip guide. They also attended a dinner for workshop participants, which provided them with an opportunity to obtain valuable insight about teachers' attitudes concerning geology and the minerals industry. Evaluations of the workshop were completed by the participants, and, taken as a whole, could be characterized as enthusiastically favorable.

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Faculty news

Abhijit Basu says he continues to "party" with planetary people with support from NASA, with sedimentologists being an associate editor for the *Journal of Sedimentary Research*, with "the best of earthly people" being the science editor for *Geological Society of America Books*, and with many others often on invitation, for example, this year in Calcutta and in Venice. He received a Distinguished Service Award from IU (see "Departmental News"), he believes, for his partying with a diverse group of people. Basu looks forward to partying with you on the Monday evenings of the GSA and AAPG/SEPM annual meetings.

Bob Dodd spent the 1996 fall semester on sabbatical leave in New Zealand at the University of Waikato in Hamilton, where he worked with Cam Nelson on a comparison of diagenetic features in non-tropical Cenozoic limestones of New Zealand with tropical Paleozoic (Mississippian) limestones of Indiana. He presented a paper on this topic at the annual meeting of the Geological Society of New Zealand. Bob will retire at the end of this fall semester, after 31 years of teaching at IU. Joan and he plan to continue living in Bloomington after retirement and will continue to be involved in university, community, and church activities. They plan to travel extensively,

starting with a trip to Micronesia during the coming winter.

Jeremy Dunning was named last January to a two-year term as interim dean of the IU School of Continuing Studies. Most recently, he served as associate dean of research and director of the Indiana University Research Park.

Colin Harvey, Noel Krothe, postdoc **Tang Dazhen**, and graduate students **Nelson Daniel** and **Burpee Franz** have completed their project to evaluate the feasibility of remining some of the older coal slurry ponds, which in places have coal qualities superior to those currently mined in Indiana. The project was
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Field station

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board **John Walda** has a summer home there), and, on their last day, several board members decided to visit the Field Station. On the basis of their visit, we were asked to present a proposal to the Board of Trustees for major renovations and upgrades to the facility, including urgently needed equipment for our fledgling environmental courses. Needless to say, we were thrilled! At the January meeting of the trustees, I made a 20-minute presentation describing the past history of the Field Station, the present state of our courses and physical facility, and a proposal for significant upgrades to the existing dormitories, office spaces, and common areas. **Bruce Douglas**, associate director of environmental field programs, followed with a 20-minute presentation describing the needs of the new courses in environmental geology. The presentations were very well received and led to a "VIP" trip to the Field

Station in early May 1997. Participants included **John Walda**, **Miles Brand** (IU president), **Fred Eichorn** (trustee), **Terry Clapacs** (vice president for administration), various IU architects and lawyers, **Bruce Douglas**, **Kim Schulte** (the Field Station secretary), and me. During the two-day trip, Bruce Douglas and I tried to give the guests a flavor of what we do in Montana, as well as an idea of where and how we need assistance. As it turned out, severe budgetary constraints have prevented the university from providing any financial assistance at the present time. However, we feel confident that our efforts will pay off in the long run, and the needed financial assistance from the university, in time, will be forthcoming.

Now for the challenging side of things. Due to the continuing slide in total enrollments (and tuition income) in G429, G429e, and G111-112, as well as fundamental changes in the financial management policies of the university, the Field Station budget dropped into the red last

year for the first time in many years. Despite the low enrollments, the College of Arts and Sciences has committed its continuing support to G429. However, our current financial situation has dictated the need for significant cost-cutting measures to the G429 program. Starting next year, G429 and G429e will be reduced from six-week/seven credit courses to five-week/six-credit courses. Much of the cost-cutting will be done in the caravan trip from Rapid City to the Field Station. The caravan will still start at Rapid City, but the trip will be reduced from seven days to four days. In addition, the Glacier Park trip will be trimmed from four days to three days. These changes have been difficult for all involved, but we believe the entire Field Station community, as well as the Field Station and Department alumni, will recognize this need for change.

On a different note, the College has been very supportive in deciding to finance our new course Environmental Field Sciences, G329. However, to get G329 off the ground financially, it has been necessary to cancel G111-112. The timing of this move is propitious, with the departure of Basu, but the loss of G111-112 will be felt by both the Field Station and the Department.

All in all, it has been quite a year for the Field Station community. I would not kid you if I said that I hope next year is not quite as tumultuous. Nevertheless, the challenges are stimulating and our continued ability to tackle them has been satisfying.

—James G. Brophy

Survey

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Other news

IGS geologist **Maria Mastalerz** continues to serve on the editorial board of the *International Journal of Coal Geology*. She and **Erik Kvale** organized a field trip, conducted in September 1996, on "Lower and Middle Pennsylvanian deposition of coal-bearing strata in southern Indiana" for the Society for Organic Pe-

trology. In July 1996, Maria hosted a researcher from the University of Queensland, M. Glikson, to discuss cooperative projects, including an international conference on coal seam gas and oil to be held in Brisbane, Australia, in 1998. She was invited to be a member of the organizing committee of this conference and to be an editor of the book that will include the conference papers and be published by Chapman & Hall.

Faculty news

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funded jointly by the Electric Power Research Institute, the state of Indiana, Southern Indiana Gas and Electric, and the Tennessee Valley Authority.

From March to June, Colin was on a sabbatical exchange with Professor **Pat Browne** of the Geothermal Institute, Department of Geology, University of Auckland, New Zealand, where he taught classes in geothermal geology and geochemistry. In July-August, Colin was in New Zealand and Asia on an Indonesian geothermal project, sampling volcanic gases in active craters at 2,000 meters on Java, and attending a workshop in industrial clays for the Malaysian government in Kuala Lumpur. During September, he was in Sumbawa and Flores on other geothermal projects. Colin presented a keynote paper on the outlook for industrial minerals in the 21st century at the SME conference in Denver last February. This won a national lecture tour award and he subsequently gave these lectures in New York, Idaho, and Reno in July and October. He continues to be the managing editor of the *Applied Clay Science Journal*.

Claudia Johnson continues to focus on gathering data from the Cretaceous tropics to document biogeographic and sedimentologic changes throughout the Caribbean. Her goal is to understand the evolution of reef ecosystems formed during a warm or "greenhouse" world, and to compare it to reefs formed during "icehouse" or glaciated times. Ultimately, she would like to invite other IU researchers to use these types of data as predictive tools for future climate changes that will affect the tropics — its biota and its peoples. **Centros**, a proposed Center for Tropical Studies at IU, will be the focus of these tropical investigations.

During the summer, Claudia, together with postdoctoral researcher **Paul Blanchon**, conducted field work on the Caribbean island of Barbados to investigate reef ecosystems during the Pleistocene, or during an "icehouse" world. Their work centered on mapping reef terraces and studying the paleoecology of reefs that formed during the last interglacial, 125,000 years ago. Paul will focus on sedimentology and sea level changes that occurred during the last

interglacial and will endeavor to tie these changes to ice sheet instability. Paul recently received an award from the Canadian Petroleum Society for the best PhD dissertation in Canada. The title of his dissertation, written at the University of Alberta, was "Controls on Modern Reef Development around Grand Cayman." Paul's expertise on the tropics makes him an invaluable part of IU's tropical research team.

The field excursion to Barbados also provided the opportunity for two master's students to collect data for their theses. **Chris Willan**, who documented the stratigraphic and paleoecologic development of reefs older than 125,000 years from the leeward side of the island, will interpret these data in light of tectonism and eustasy. **Kristin Wood** investigated the stratigraphic and paleoecologic development of reefs and related facies in terms of carbonate sequence stratigraphy. **Todd Ventura** conducted investigations in the Florida Keys to determine how speciation in tropical reefs occurs. He documented diversity below and above disturbance events and will analyze these data in terms of the intermediate disturbance hypothesis, an hypothesis that suggests speciation is high because systems are continuously disrupted, and species either die or evolve to accommodate these changes.

Erle Kauffman is recovering from his illness incurred in September 1996. He has regained his speech and is working toward resuming his teaching and research responsibilities. Erle was recently honored by being named the recipient of the 1998 Twenhofel Medal by the Society of Sedimentary Geology, in addition to his being named the 1997 recipient of the Gilbert Harris Award of the Paleontological Research Institution (see "Departmental News"). Erle's two masters students are finishing their theses. **Kate Pickford** has recently completed a combined paleobiologic and geochemical study of salinities in modern estuaries and modeled the results for the geologic record. **Sean Machovoe** is investigating amalgamation surfaces formed from New Mexico to Colorado during the Cretaceous. His goal is to use stratigraphic and biostratigraphic correlations to determine changes in sea level, sediment supply and accommodation space.

Erle and Claudia are settling into their

new community with the purchase of a home. They are enjoying the numerous artistic performances offered through the University and local establishments and travel regionally to explore their new surroundings.

Enrique Merino gave an invited talk on his research on agate quartz textures and participated on a research panel of the Japanese Science and Technology Corp. to fund research in Japan on crystallography, crystal growth, and related geochemistry. His personal reaction is that the research is terrific and Tokyo great. At the request of **Raymond Fletcher**, a prominent rheologist, Fletcher is now collaborating with Enrique on the combined study of rheology and kinetics of replacement/creep/earthquake triggering. Some of this work was presented at the Goldschmidt Geochemistry Conference in Tucson in May and more was presented at the Salt Lake City GSA meeting in October. On a sad personal note, Consuelo and Enrique have informed us that their children lost two grandparents in the same month this past year.

Haydn Murray has not slowed down since his retirement from teaching in 1994. He presented the keynote lecture at the Golden Jubilee Meeting of the British Clay Minerals Group in Aberdeen, Scotland, held on April 10-11. As President of the Association Internationale pour l'Etude des Argiles, he gave the presidential address in Ottawa, Canada, during the June 16-21 meeting. His current graduate students, **Karen Keith** and **Hemzacek Laukant**, and former students **Tom Dombrowski**, MA'82, PhD'92; **Bob Pruett**, MS'88, PhD'93; **Jun Yuan**, MS'90, PhD'95; **Tom Toth**, BS'86, MS'89; **Huitang Zhou**, PhD'96; and **William Moll**, MA'58 presented papers. Former postdoctoral research associates **Emilio Galan** (Spain), **Fernando Cravero** (Argentina), and **Eduardo Dominguez** (Argentina) also presented papers.

Haydn and Juanita spent last January through April at their condominium in Bonita Springs, Fla. They also took trips to China, Argentina (three times), Brazil (twice), Scotland, England, Portugal, France, and Canada. Haydn is assistant to the vice president of Research and the University Graduate School, where his responsibility is the Indiana Geological Survey. **Norm Hester** will retire as director of the Indiana Survey on July 1, 1998, and Haydn chairs the search committee to select the new director. In addition, he chaired the committee to de-

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Faculty news

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termine whether or not to replace the AstroTurf at Memorial Stadium with natural grass. The recommendation was to convert to grass and this will take place, beginning immediately with the conclusion of the 1997 football season.

Ed Ripley notes that **Megan McCoy**, MS'97, finished her master's thesis on the Golden Sunlight Mine, Whitehall, Mont., where she studied the mineralogy and oxidation potential of oxide waste piles. She is now doing field geochemical exploration (mainly gold) for Placer Dome in Alaska. **Young-Rok Park** continues his PhD research dealing with an oxygen and hydrogen isotopic study of alteration and fluid flow in

the North Shore Volcanic Group and related sills above the Duluth Complex in Minnesota. **Tim Johnson** has started PhD research on the genesis of beryl-lite mineralization in the topaz rhyolites of the Spor Mountain area of Utah. **Brian Butler**, MS'89, continues his interesting work with ABB Environmental doing clean-up of former missile bases in Russia. **Insung Lee**, PhD'95, has been promoted in the Korea Basic Science Institute, where he is now group manager of the Isotope Section.

Ed visited the enormous Voisey's Bay Ni-Cu-Co deposit in northern Labrador during June. Development work is in full swing, with mining scheduled to begin in 1998. The property was purchased by INCO, but is administered by former employees of Diamond Fields

and Archean Resources (initial discoverers) under the name of Voisey's Bay Nickel. On the personal side, Ed notes that son Eric is at IU studying pre-environmental law and playing for the IU soccer team, which has been ranked No. one nationally during fall 1997 after finishing in the final eight in the NCAA tournament the previous season. Younger son Jonathan is a senior at Bloomington South, where he also plays soccer and is a member of the Sounds of South show choir. He plans to study music and business and play soccer in college, but has not decided on where.

Al Rudman will retire at the end of the spring semester 1998 after 33 years of teaching and research at IU. He will stay at IU after retirement and continue
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Look who's talking: 1996-97

Colloquium Series

• Sept. 5, **Pim F. van Bergen** and **Artur Stankiewicz**, University of Bristol, UK: "Resistant Biomolecules in the Biosphere and Geosphere; Part I - Macromolecules in Plants and their Contribution to Coal and Kerogen; Part II - Macromolecules in Modern and Fossil Invertebrates and their Fate in Sediments"

• Sept. 9, **John Delano**, State University of New York at Albany: "Geochemical and Geophysical Barriers to the Formation of Life on Earth at > 4.0 Gyr: Testable Hypotheses"

• Sept. 30, **Edith Newton Wilson**, Amoco Corp.: "Rock Fabric Control on the Distribution of Petroleum in Jurassic Carbonates of the Arabian Basin"

• Oct. 14, **Mark Richardson**, Exxon Production Research Company: "Directions of Research in Reservoir Geochemistry at Exxon Production Research Co."

• Oct. 21, **Mark Zoback**, Stanford University: "Crustal Structure, Heat Flow and Intraplate Lithospheric Structure"

• Nov. 11, **Eric Barron**, The Pennsylvania State University: "The Role of the Ocean in Past Climate Change"

• Dec. 6, **Donna Jurdy**, Northwestern University: "Active Tectonics on Venus: Evidence from Coronae and Chasmata": (AAPG Distinguished Lecturer)

• Jan. 13, **Walter Dean**, U.S. Geological Survey, Denver: "Linked Biogeochemical Cycles in North Temperate Lakes"

• Feb. 24, **Ramon Arrowsmith**, Arizona State University: "Active Tectonics in Areas of Continental Collision: the Northern Pamir Mountains of Central Asia"

• Mar. 10, **Don Anderson**, California Institute of Technology: "Plates vs. Plumes"

• Apr. 10, **Robert Henchoz**, Geco-Prakla for North and South America: "Overview of the Geco-Prakla Marine and Transition Zone Geophysical Exploration"

• Apr. 14, **Robert Berner**, Yale University: "Plants, Weathering, and Paleozoic CO₂"

• Apr. 16, **Ian Hutcheon**, University of Calgary: "The Origin of H₂S by Thermal Sulfate Reduction"

• Apr. 21, **Paul Blanchon**, Indiana University: "Coral Reef Records of Climate and Sea Level Change: a Process Approach"

Other presentations

• Sept. 10, **John Delano**, State University of New York at Albany: "High-Precision Chronostratigraphy in Middle Ordovician Strata of New York State: Geochemistry of Rhyolitic Melt Inclusions"

• Sept. 11, **Nathan Way**, Indiana University: "Paleostructural Localization



of Upper Morrow Barrier Coastlines: A Prospect in Southwest Kansas"

• Feb. 25, **Ramon Arrowsmith**, Arizona State University: "Coupled Surface Processes and Earthquake Deformation along the San Andreas Fault System"

• Mar. 12, **J. Robert Dodd**, Indiana University: "New Zealand Geologic Travel Log"

• Mar. 31, **Pat Browne**, University of Auckland: "Volcanism and Geothermal Activity over the Past 120 Years at Tarawera-Waimangu, New Zealand"

• April 22, **Estella Atekwana**, Western Michigan University: "Anomalous Conductivities Associated with an LNAPL Plume Imaged by Integrated Geophysical Techniques"

• April 22, **Eliot Atekwana**, Western Michigan University: "Dissolved Inorganic Carbon (DIC) in the Hydrologic Environment and its Biogeochemical Implications"

• April 28, **Abhijit Basu**, Indiana University: "A Perspective on Early Mars and Early Mars Life"

• May 1, **Anthony Lowry**, Victoria University, New Zealand: "Implications of Flexural Analysis for Tectonism and Rheology of the Lithosphere"

Faculty research grants 1996-97

• A. BASU (NASA) — “Petrologic evolution of lunar and meteorite parent body regolith.”

• S. BRASSELL (UNOCAL) — “Organic Geochemistry.”

• S. BRASSELL (National Leading Laboratories of China) — “Biogeochemical evidence of environmental and climatic change in the sedimentary record of Lake Gucheng Hu, Nanjing, China.”

• S. BRASSELL (NOAA) — “Development and calibration of paleoclimate proxies: a sediment trap study in Santa Barbara Basin.”

• S. BRASSELL (NSF) — “Modernization of Biogeochemical Laboratories.”

• S. BRASSELL (Petrobrás) — “Cooperative agreement for research in biogeochemistry and petroleum geochemistry.”

• S. BRASSELL (Research Faculty Fund) — “Semi-automated facility for Biogeochemical sample processing.”

• M. DORAIS (NSF) — “History of Terrane Assembly, Eastern New England.”

• B. DOUGLAS (USGS) — “Geologic Field Mapping of Cenozoic Deposits in the Willow Creek Watershed.”

• B. DOUGLAS (NSF) — “Curriculum Development for Interdisciplinary Field Courses in Environmental Geosciences.”

• M. HAMBURGER (NSF) — “Analysis of Seismic Data from Pinatubo Volcano, Philippines.”

• M. HAMBURGER (NASA) — “Application of Global Positioning System Measurements to Continental Collision in the Pamit-Tien Shan Region, Soviet Central Asia.”

• M. HAMBURGER (NSF) — “Application of Global Positioning System Measurements to Continental Collision in the Pamit-Tien Shan Region, Soviet Central Asia.”

• M. HAMBURGER (IRIS) — “Seismic Array Studies in Eurasia.”

• M. HAMBURGER (USGS) — “A Comprehensive Geophysical Investigation to Assess Seismic Hazards in the Wabash Valley Seismic Zone: A case Study of the New Harmony Fault.”

• M. HAMBURGER (IRIS) — “Teacher-Training Workshop conducted in support of the Princeton Earth Physics Project.”

• M. HAMBURGER (USGS) — “GPS Measurement of Crustal Deformation in the Wabash Valley Seismic Zone.”

• C. HARVEY (SIGECO) — “Assessment of Low Cost Slurry Fuels for Power Generation in Southern Indiana.”

• C. HARVEY (EPRI) — “High Gradient Magnetic Separation of Sulfur and Clay from Coal Fines.”

• C. JOHNSON (NSF) — “Testing the hypothesis of a Cretaceous Supertropical climate zone in the Caribbean Province: Do climate simulations and observational data support the concept of tropical stability?”

• E. KAUFFMAN (NSF) — “Testing the hypothesis of a Cretaceous Supertropical climate zone in the Caribbean Province: Do climate simulations and observational data support the concept of tropical stability?”

• N. KROTHER (Westinghouse) — “Hydrochemical Field Research and Isotopic Studies.”

• N. KROTHER (US Army Corps of Engineers) — “A Hydrochemical Study to Determine the Groundwater Flow and Chemical Transport in the Big Clifty/Beech Creek Aquifer beneath the Ammunition Burning Grounds, Naval Weapons Support Center, Crane, Indiana.”

Faculty news

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to be active in the geophysics group. Anyone wishing to attend Al's retirement reception and dinner at Chapman's in Bloomington on May 2, 1998, should contact Dave Towell.

Bob (see “In Memoriam”) and **Sue Shaver** took a brief vacation in southern Ireland during late June and early July 1997. Sue's purpose was relaxation so she could come back completely refreshed and could work even harder for the IGS. Bob's purpose was to consort with leprechauns and fair Irish lasses, to kiss the Blarney Stone and restore his lowered supply, and to see if St. Patrick really had driven off all the snakes. Sadly, Bob died in September.

Lee Suttner reports that his students **Nathan Way** (Ph.), **Craig Rankin** (MS), and **Chris Yokohama** (MS) continue to make major contributions to his effort to better understand tectonic controls on the geometry and architecture of nonmarine deposits in the medial and distal parts of the Rocky Mountain foreland basin. Long-term recurrent movement along basement-rooted structures appears to be the prevailing control on the location of major paleodrainages. **Michael Zaleha**, who did his PhD work under John Bridge, continues with Lee's research group in a postdoctoral position and is performing paleohydraulic reconstructions of the major Early Cretaceous rivers throughout much of Wyoming. The thrust of this

work is to quantitatively determine how hydraulic properties of these rivers changed in the vicinity of active structures. A major grant has been received from NSF to fund an additional two years of this study.

On the personal side, Lee and Ginny celebrated giving away their daughter, Lori, in marriage on Aug. 6. In September, Jennifer gave birth to their second grandson, Davis Lee. The grandparents are also proud to announce that Davis's six-year old brother Daniel's golf handicap has dropped 11 strokes in the past year.

Dave Towell continues to edit this newsletter and is working on the endowment campaign for the Department. This past summer was his 30th teaching at the Geologic Field Station. Year-round running, hiking, and roller blading keeps him sufficiently fit to keep up with the students in Montana. He continues to enjoy serving on the University Athletics Committee and was in the midst of some challenging actions taken this past year, including the dismissal and hiring of football coaching staffs and the decisions to determine the timetable for the addition of three new women's sports. Currently, Dave chairs the Student Welfare Subcommittee and serves on a task force that is developing a code of conduct for IU student athletes that is both consistent with guidelines stated by the Big Ten Conference and compatible with the recently implemented IU Code of Student Rights, Responsibilities, and Conduct.

• N. KROTHER (SIGECO) — “Assessment of Low Cost Slurry Fuels for Power Generation in southern Indiana.”

• N. KROTHER (Westinghouse) — “Comparison of the Hydrogeology and Hydrochemistry at the Lemon Lane Landfill and Neal’s Landfill, Bloomington, Indiana.”

• N.G. LANE (NSF) — “Echinoderm Rebound and Diversification after the Late Devonian Extinction: Evidence from Asian Echinoderm Faunas.”

• R. MACKIE (NSF) — “Upper Mantle Electrical Conductivity Variations beneath North America and Adjacent Oceans: A Collaborative Study.”

• R. MACKIE (NSF) — “Collaborative Research: Crustal Reworking during Orogeny: An Active System Himalayan Perspective.”

• R. MACKIE (NSF) — “Crustal Structure at Nanga Parbat, Northern Pakistan, from Magnetotelluric Soundings.”

• E. MERINO (IU, RUGS) — “Replacement, creep, and earthquakes: alternative consequences of crystal growth in rocks.”

• G. OLYPHANT (National Park Service) — “Hydrologic Monitoring Associated with Pilot Restoration of the Great Marsh, Indiana Dunes National Lakeshore.”

• G. OLYPHANT (EPA) — “Great Marsh Wetland Habitat Restoration.”

• G. OLYPHANT (IDNR, Div. of Reclamation) — “Evaluation of the Hydrologic and Chemical Effects of Reclaiming a Coarse-refuse Deposit with Ash Fill and a Poz-o-tec Cap.”

• G. OLYPHANT (IDEM/EPA/State Chemists Office) — “Development of a Statistically Valid Program of Monitoring Pesticides in Ground Water in the State of Indiana.”

• G. OLYPHANT (NSF) — “Curriculum Development for Interdisciplinary Field Courses in Environmental Geosciences.”

• G. OLYPHANT (USGS-NGMP) — “Systems Mapping of Bedrock and Nonlithified Overburden in the Loogootee and Montgomery 7.5 Minute Quadrangles, Daviess County, Indiana.”

• G. OLYPHANT (U.S. EPA) — “Hydrologic Monitoring and Watershed Modeling associated with the Great Marsh Restoration Project.”

• L. ONESTI (US Fish and Wildlife Service) — “Augusta Lake Anoxic Limestone Drain and Wetlands Project.”

• L. ONESTI (IDNR, Dept. of Water) — “Field Locate Water Well Records and Determine UTM Coordinates to Enhance IDNR-DOW Computer Database.”

• G. PAVLIS (AFOSR) — “Broad-band signal enhancement of seismic array data: application to long-period surface waves and high-frequency wavefields.”

• G. PAVLIS (IRIS) — “Seismic Array Studies in Eurasia.”

• G. PAVLIS (AFOSR-ASSERT) — “Innovative seismic array analysis for studies of wave propagation in the Earth.”

• G. PAVLIS (USGS) — “A comprehensive geophysical investigation to assess seismic hazards in the Wabash Valley Seismic Zone: A Case Study of the New Harmony Fault.”

• G. PAVLIS (NSF) — “Geodynamics of Intracontinental Mountain Building in the Tien Shan of Central Asia.”

• L. PRATT (Mobil Research and Development Company) — “Award for Research.”

• L. PRATT (Exxon Education Foundation) — “Student Travel and Fieldwork.”

• L. PRATT (Cominco, Alaska Inc.) — “Organic geochemistry of lead-zinc ore and black shale host rock at Red Dog Mine, Alaska.”

• L. PRATT (NSF) — “Molecular and isotopic composition of lipids in bivalve shells: records of biosynthetic origins and paleoenvironmental change.”

• L. PRATT — (various commercial/industrial) “Research in Sedimentary Organic Geochemistry.”

• E. RIPLEY (NSF) — “Isotopic studies of the North Shore Volcanic Group and related hypabyssal rocks, Midcontinent Rift System, Minnesota.”

• E. RIPLEY (Golden Sunlight Mine) — “Mineralogical and geochemical characterization of oxide waste stockpiles, Golden Sunlight Mine, Whitehall, Montana.”

• E. RIPLEY (Natural Sciences and Engineering Research Council of Canada) — “Petrological, mineralogical, geochemical, and isotopic studies of the Ni-Cu-Co deposit at Voisey’s Bay, Labrador.”

• E. RIPLEY (Mississippi Valley Archaeology Center) — “Isotopic analyses of lithic fragments, Chally-Turbenson site, Minnesota.”

• E. RIPLEY (NSF) — “Stable isotopic systematics of magmatic amphiboles in Precambrian mafic and ultramafic rocks.”

• E. RIPLEY (NSF) — “Isotopic Studies of Hydrothermal Flow Systems above and below the Duluth Complex, Midcontinent Rift System, Minnesota.”

• A. RUDMAN (USGS/NEHRP) — “Assessment of Seismic Hazards in Wabash Valley.”

• M. SAVARESE (American Chemical Society) — “Paleobiological and Paleoenvironmental context of corallomorph-bearing Lower Cambrian reefs, South Australia.”

• A. SCHIMMELMANN (American Chemical Society) — “Isotopic responses and exchange of hydrogen and nitrogen in kerogen during thermal alteration across the oil window.”

• A. SCHIMMELMANN (NASA) — “Isotopic Biochemistry.”

• A. SCHIMMELMANN (NSF) — “Factors Controlling ¹³C in Algal and Sedimentary Biomarkers from the Amundsen and Bellingshausen Seas, Antarctica.”

• L. SUTTNER (IU, RUGS) — “Development of a Demonstration Watershed in the Willow Cr. Drainage adjacent to the IU Geologic Field Station in Montana.”

• L. SUTTNER (NSF) — “Effects of Intra-Basinal Structures on Early Cretaceous Fluvial Systems (Lakota/Cloverly Formations), Central Cordilleran Foreland Basin.”

• R. WINTSCH (State of Connecticut) — “Bedrock geology mapping of the Rockville 7.5-minute quadrangle, Connecticut.”



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Student news

The increase in recruiting activity of energy companies in the Department has continued during the past year. Seven companies sent representatives to recruit both full-time employees and interns during 1996-97:

- Amoco Exploration & Production, Houston, Texas (Paul Singer and Edith Wilson).
- Chevron, Lafayette, Louisiana (Carole Rock).
- Exxon Exploration Co. & Exxon Co., USA, Houston, Texas (Barbara Rassmann and William M. Shorb, BS '80)
- Exxon Production Research Company, Houston, Texas (Mark Richardson)
- Shell Oil Company, Houston, Texas (Michael Vogel)
- Newmont Exploration Company (John Jory)
- Geco-Prakla (Schlumberger), Houston, Texas (Robert Henchoz)

Awards & Grants

Undergraduate

- N. Gary Lane Award: Jeffrey Dick (Hammond, Ind.)
- Junior Professional Development Award: Mark Panning (Columbus, Ind.)
- Professional Development Award: Amanda Reynolds (Wintersville, Ohio)
- Senior Faculty Awards: Karen Cyr (Fort Wayne, Ind.) & Terry Arcuri (Bloomington, Ind.)
- Chevron Geophysics Award: Mark Panning (Columbus, Ind.)
- Field Station Scholarships (IU): Amanda Reynolds (Deiss Award), (Wintersville, Ohio), Adam Haulter (Russiaville, Ind.), Jody Foss (Naperville, Ill.), Kari Murphy (Noblesville, Ind.), Jennifer Wessel (New Orleans, La.), Steven McIntire (Seymour, Ind.), Jill Taylor (Bloomington, Ind.), Rebecca Travis (Zionsville, Ind.)

Graduate

- Estwing Award (Hammer) and Outstanding Academic Achievement: Cara Davis (Honolulu, Hawaii)
- Department of Geological Sciences Award for Academic Achievement: Lorie Bear (Creve Coeur, Mo.)
- Outstanding Associate Instructor-Rawles Award: Audrey Aronowsky (San Francisco, Calif.)
- University Graduate School Fellow-

ships: German Mora (Bogota, Columbia, South America), Sandra Talarovich (Petersburg, Va.)

- Geochemistry Fellowship: Alex Sessions (Lexington, Va.)
- Phillips Petroleum Fellowship: Dorothy Payne (Berkeley, Calif.)
- Chevron Oil Fellowship in Geophysics: Scott Neal (San Bernardino, Calif.)
- Grassman Fellowship: Karan Keith (Leawood, Kan.)
- Arts and Sciences Fellowship: Sujoy Ghose (Calcutta, India)
- American Federation of Mineralogical Societies Scholarship Foundation Awards: Jennifer Ayers (Claudville, Va.), James Jacobson (Crystal Lake, Ill.)
- Patton Awards: Karan Keith (Leawood, Kan.), Nathan Way (Bloomington, Ind.) and Joseph Brumley (Richmond, Ind.)

• Shell Summer Research Fellowships: Katrina Gobetz (South Windsor, Conn.), Timothy Johnson (Auburn, Ala.), Eung-Seok Lee (Kwacheon, Korea), Sally Letsinger (Greenfield, Ind.), German Mora (Bogota, Columbia, South America), Todd Ventura (Dallas, Texas), Chris Willan (Succasunna, N.J.), Kristin Wood (Windsor, N.Y.)

- Chrysalis Scholarship, The Association for Women Geoscientists: Jean Hemzacek Laukant (Villa Park, Ill.)
- Paleontological Society Grant, Todd Ventura (Dallas, Texas)
- Geological Society of America Grant-in-Aid of Research, Eung-Seok Lee (Kwacheon City, Korea)
- Sigma Xi Grant-in-Aid of Research, Todd Ventura (Dallas, Texas)

Degrees Awarded

Bachelor of Arts — 1996

- Allen, Patrick C. (Centerville, Ohio)
- Lucas, Bruce T. (Fort Wayne, Ind.)
- Robinson, Heather M. (Shelbyville, Ind.)
- Weidner, John J. (Hammond, Ind.)

Bachelor of Science — 1996

- Buehler, Mark A. (Bloomington, Ind.)
- Cherry, Paul E. (Anderson, Ind.)
- Jessie, Scott D. (Columbus, Ind.)

Master of Science — 1996/97

- Daniel, D. Nelson; Beckley, West Virginia (1997), "Geologic Assessment of Coal Fines in Southwestern Indiana Slurry Impoundments

• De Gnazio, Frank J.; Pittsburgh, Pa. (1997), "¹⁵N of Nitrate from a Contaminated Aquifer Beneath the Ammunition Burning Ground, Crane Naval Surface Warfare Center, Indiana"

• Dintaman, Christopher R.; Bloomington, Ind. (1997), "Unsaturated Flow and Water-Table Recharge in a Dune-Wetland Setting, Beverly Shores, Indiana"

• Dreher, Scott T.; Champaign, Ill. (1996), "The Origin of Composition Gaps at South Sister Volcano, High Cascades, Central Oregon; Implications for Crystallization Processes beneath Active Calc-Alkaline Volcanoes"

• Dzvoniak, Joseph P.; McKeesport, Pa. (1996), "Alkenones as Records of Oceanic Paleotemperatures; Studies of Eocene and Oligocene Sediments from the North, South, and Equatorial Atlantic"

• Hsieh, Jen-Chieh; Taipei, Taiwan, China (1997), "An Evaluation of the Parameter Estimates for Wan Genutchen's Characteristic Equations Determined from Numerical Inversion of a Time-Dependent Unsaturated Flow Model"

• McCoy, Megan E.; Spokane, Wa. (1997), "Oxide Stockpile Assessment, Golden Sunlight Mine, Whitehall, Mont."

• Mora, German; Bogota, Columbia, South America (1997), "Geochemical and Isotopic Record of Climate Fluctuations during the Middle to Late Pleistocene in Lacustrine Deposits from the Sabara de Bogota Basin, Columbia"

• Noriega, Matthew; McLean, Va. (1997), "Hydrogeochemical and Stable Isotope Evaluations of Storm Discharge from the Beech Creek Aquifer (Crane Naval Weapons Support Center, Ind.)"

• Qin, Changxing; Gansu, China (1996), Research Project: "Banded Diagenetic Pressure Seals: Types, Mechanisms, and Homogenized Basin Dynamics"

• Rankin, Craig S.; Avella, Pa. (1997), "The Influence of Subtle Tectonic Movement along Lineaments and within Structural Zones on Deposition of the Lakota Formation, Southwestern Black Hills, USA"

• Ryu, Ji-Hun; Seoul, Korea (1997), Research Project: "A Study of Effectiveness of Anoxic Limestone Drains, Aerobic Wetlands, and Successive Alkalinites"

(continued on page 17)

Advisory board update

The Advisory Board of the Department met in Bloomington on Oct. 2-4, with **Malcolm Boyce** (Chevron Overseas Petroleum Inc., retired) as president and **Richard Gibson** (Gibson Con-

sulting) as vice president.

Members of the board who attended the meeting were **Stanley Anderson** (Houston Exploration Co.), **Robert Blakely** (geophysicist emeritus, Indiana

Geological Survey), **Malcolm Boyce** (Chevron Overseas Petroleum Inc., retired), **Michael Cowen** (petroleum geologist), **Ferol Fish** (Gas Research Inc.)
(continued on page 18)

IU Department of Geological Sciences Advisory Board 1997-98



ADVISORY BOARD MEMBERS ATTENDING THE OCTOBER MEETING: 1. Malcolm Boyce 2. George Nevers 3. Ferol Fish 4. Richard Gibson 5. Sarah Burton 6. Lee Suttner 7. Susan Green 8. Michael Cowen 9. Daniel Tudor 10. Michael Mound 11. Stanley Anderson 12. Robert Blakely 13. Judson Mead 14. Daniel Sullivan 15. Steven Young 16. Kenneth Vance 17. Derek Fullerton 18. Frank Pruett



Student news

(continued from page 16)

Producing Systems for Treatment of Acid Mine Drainage in the Augusta Lake Area, Indiana"

• Stotts, Richard E.; Bethel, Conn. (1997), "Chemomechanical Effects in Aqueous Environments on Fault Gouge Rheology"

• Surge, M. Donna; Deer Park, N.Y. (1996), "Geochemical and Petrologic Evidence for Limited Diagenesis in Lower Cambrian Carbonates, South Australia; Implications for Photosymbiosis and Depth-Related Variations in Primary Productivity"

Doctorate — 1996-97

• Bruchert, Volker; Munich, Germany (1997), "Early Diagenesis of Sulfur and Preservation of Organic Matter: Sulfur Distribution and Stable Isotopic Composition"

• Carmo, Ana Maria; Rio de Janeiro, Brazil, South America (1997), "An Isotopic and Geochemical Study of Climatic and Oceanographic Factors Influencing Organic-Matter Preservation during the Late Cretaceous in the Sergipe Basin, Brazil"

• Sakrani, Khairiddine; Ain Abid, Algeria (1996), "A Unified Texture and Mineralogy Dependent Model for Rock Formation"

• Santosneto, Eugenio; Sao Paulo, Brazil, South America (1996), "Isotopic Characterization of the Cretaceous Lacustrine and Marine-Evaporitic Sequences and Related Oils from the Portguar Basin, Northeastern Brazil"

• Shaffer, Nelson R.; Bloomington, Ind. (1996), "Lateral Variations in Mineralogy and Geochemistry of Pennsylvanian Black Shale Sequences Related to Contemporaneous Fresh Water Channels, Southwestern Indiana"

• Zhou, Huitang; Linyi, Shangxi Prov., China (1996), "Mineralogical and Industrial Evaluation of a Palygorskite Deposit from Guanshan, Anhui Province, P.R. China"

Alumni board

(continued from page 17)

stitute, retired), **Derek Fullerton** (president, Exmin Corp.), **Richard Gibson** (consulting geologist, Gibson Consulting), **Judson Mead** (professor emeritus, geological sciences, IU), **Michael Mound** (vice president, QCX Systems), **George Nevers** (Garnet Resources Corp., retired), **Frank Pruett** (director, Indiana Geosciences Institute), **Daniel Sullivan** (Indiana Geological Survey, retired), **Daniel Tudor** (Chevron Exploration & Production Services Co., retired), **Kenneth Vance** (Anadarko Petroleum Corp., retired), and **Steven Young** (geological associate, Exxon Exploration Co.).

Members of the board unable to attend were **Thomas Dobecki** (manager of geophysics, Fugro-McClelland), **Michael Graham** (U.S. Water, LLC), **Stephan Graham** (professor, Stanford University), **Glenn Hieshima** (senior research geologist, Exxon Production Research Co.), **Helen McCammon** (U.S. Department of Energy, retired), **Richard McCammon** (U.S. Geological Survey, retired), **Ann Marie Petricca** (geologist, ERM, New England Inc.), **Thomas Straw** (Western Michigan University, retired), **Glenn Thompson** (president, Tracer Research Corp.), and **Jerome Thornburg** (geophysicist, Conoco Inc.).

The Executive Committee of the board met on Thursday with a variety of faculty and administrators. College of Arts and Sciences Dean **Morton Lowengrub** summarized the College Incentive Program and his impressions of the report of the Visiting Review Committee, which participated, in May, in the external review of the Department by the College (as part of the program of periodic external reviews of all departments in the College). A key element of this review related to the recommendation that faculty size needs to be increased in order to meet the goals of the Strategic Plan (discussed in the previous issue of this newsletter) and to reach an improved national quality ranking. Faculty size has dropped by more than 25 percent in the past five years and needs to be restored. The committee and the department faculty concur on this and on the selection of a new chair from outside of the Department. The dean has authorized two immediate faculty searches, one for the new chair. In the late afternoon, board members **Steve Young** and **Dick Gibson** conducted a panel discussion with students on the general topic of recruit-

ment in the oil and gas industry. Pizza and other refreshments accompanied this informal gathering. Following this, the board met during the early evening with faculty to further discuss the recommendations of the Visiting Review Committee.

The Friday morning session began with chair **Lee Suttner's** annual statement, including an assessment of progress on the Strategic Plan. Following this were presentations on graduate (**Simon Brassell**) and undergraduate (**Jim Brophy** and **Bruce Douglas**) curriculum initiatives. The morning concluded with the Advisory Board meeting with and then having lunch with the Student Advisory Committee. The afternoon session began with a discussion, led by **George Nevers**, **Lee Suttner**, and **Susan Green** (College), on the progress in planning for the endowment campaign, named Geological Sciences at the Forefront. Subsequently, presentations were given on the current status of the Geology Library (**Lois Heiser**); the program in geophysics (**Michael Hamburger**, **Gary Pavlis**, and **Al Rudman**); the proposed Center for Geospatial Analysis (**Greg Olyphant** and **Gordon Fraser**); the Geologic Field Station (**Jim Brophy** and **Bruce Douglas**); and the field environmental sciences curriculum (**Bruce Douglas**, **Noel Krothe**, and **Greg Olyphant**).

Friday concluded with the annual potluck dinner with Advisory Board members, faculty, spouses, and friends at the University Club, an event that was as popular as ever.

The final session of the board, on Saturday morning, started with a brief report from the Financial Committee on Endowments presented by **George Nevers** and **Derek Fullerton**. Next, **Simon Brassell** and **Ed Ripley** reported on the status of the isotope/analytical chemistry laboratories, and **Claudia Johnson** gave a presentation on the proposed Center for Tropical Studies. The meeting concluded with a closed session of the board to consider administrative business. A few loyal souls headed for Memorial Stadium for the football clash between the Hoosiers and the Michigan Wolverines.

Tentative plans, subject to availability of facilities, are for the next board meeting to be held in New Harmony on Oct. 1-3, 1998. The meeting will begin with a social function for Evansville and other Tri-State area alumni on Thursday evening.

Department of Geological Sciences faculty & staff

Professors: Abhijit Basu, Simon Brassell, James Brophy, J. Robert Dodd, Jeremy Dunning, Michael Hamburger, Norman Hester, Noel Krothe, Enrique Merino, Greg Olyphant, Lawrence Onesti, Gary Pavlis, Lisa Pratt, Edward Ripley, Albert Rudman, Lee Suttner (chair), David Towell, and Robert Wintsch.

Part-Time Professors: Donald Carr (Survey), Gordon Fraser (Survey), Henk Haitjema (SPEA), Brian Keith (Survey), Peter Ortoleva (Chemistry), Carl Rexroad (Survey), Jeff White (SPEA)

Professors Emeriti: Robert Blakely, John Droste, Donald Hattin, Alan Horowitz, N. Gary Lane, Judson Mead, Haydn Murray, Charles Vitaliano

Research Scientists: Michael Dorais, Bruce Douglas, Colin Harvey, Arndt Schimmelmann

Postdoctoral Fellows: Paul Blanchon, Anthony Lowry, Michael J. Zaleha

Librarian: Lois Heiser

Library Staff: Dennis Scoville (technical services), Linda Stewart (circulation/reserves)

Staff: Sarah Burton, administrative assistant, chair's office; Patty Byrum, administrative secretary, chair's office; Lorie Canada, secretary, fourth floor; Ruth Droppo, secretary, third floor; Grant Estey, resident manager, Geologic Field Station, Montana; Candace Franz, secretary, clay mineralogy, first floor; Gillian Leonard, office services assistant, business office; Mary Iverson, student records; Kim Schulte, senior administrative secretary, Geologic Field Station; Brian Snow, computer systems manager; Terry Stigall, geophysics electronics technician; Steve Studley, manager, mass spec. laboratory; the position of chemist, analytical chemical laboratory manager, is currently vacant

Alumni news

William Ausich, MA'76, PhD'78, continues to serve as chair of the Department of Geological Sciences at Ohio State University, Columbus.

Christopher Gellasch, MS'94, has been promoted to the rank of Captain in the United States Army. Chris is still located in Denver, but travels extensively in the U.S. while carrying out environmental assessments at various military bases.

Kennard B. Bork, MA'64, PhD'67, is the 1997 recipient of the History of Geology Award of the Geological Society of America History of Geology Divi-

sion. Ken is Alumni Professor of Geology and Geography at Denison University, Granville, Ohio. The award is given annually in recognition of outstanding contributions to the understanding of the history of geological sciences in America and abroad. Past recipients of this award have all come from major research universities, so this makes Ken the first faculty member from an undergraduate liberal arts college to receive the award. Bork is the author of *The Life and Times of Kirtley Fletcher Mather (1888-1978): Scientist, Teacher and Social Activist*, published in 1994. Mather,

the prominent Harvard professor, was both a Denison graduate and Denison faculty member, who challenged attacks against traditional democratic ideals and joined Clarence Darrow in defending John Scopes at the 1925 "monkey trial."

Michael Edward Hohn, MA'75, PhD'76, is senior research geologist at the West Virginia Geological and Economic Survey, in which position he is mainly involved in conducting resource assessment studies. Mike is editor in chief of the *Journal of Mathematical Geology*, and is also past president of the Interna-

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What's new with you?

Please fill in as much of the following information as you wish. Its purpose, in addition to providing us with your class note, is to keep IU's alumni records accurate and up to date.

Publication carrying this insert: Geologic Record Date _____

Name _____

Preferred name _____

Last name while at IU _____ IU Degree(s)/Yr(s) _____

Soc. Sec. # or Student ID # _____

Home address _____ Phone _____

City _____ State _____ Zip _____

Business title _____ Company/Institution _____

Company address _____ Phone _____

City _____ State _____ Zip _____

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** Please indicate clearly upper and lower case.*

Mailing address preference: Home Business

Spouse name _____ Last name while at IU _____

IU Degree(s)/Yr(s) _____

Your news: _____

Please mail to the address on the back of this magazine, or fax to (812) 855-8266.

Alumni news

(continued from page 19)

tional Association for Mathematical Geology. He is working on the second edition of his book *Geostatistics and Petroleum Geology*. Mike is married to Kay (Christensen), and they have two children, Geoffrey (12) and Abigail (8).

Frank E. Kottowski, BA'47, MA'49, PhD'51, was the 1996 recipient of the Gilbert H. Cady Award of the Coal Geology Division of the Geological Society of America. Frank received the award at the annual meeting of GSA held in Denver, Colo., in October 1996. Frank was a recipient of the Richard Owen Award of the Department of Geological Sciences in 1986-87.

Alan P. Laferriere, MA'81, PhD'87, has changed positions. After 10 years as staff geophysicist with Exxon Production and Research in Houston, he is now staff geophysicist with the New Ventures Group of Elf Exploration Inc., which is a subsidiary of Elf Aquitaine and is working in the deep (3,000'-4,000') Gulf of Mexico. Al lives in Houston, Texas.

J. David Lazor, MA'68, PhD'71, an-

nounces that the Houston Geological Society Grand Canyon Rafting Field Trip Committee is accepting reservations for the June 8-15, 1998, trip, which may be the last one for awhile. The trip is at cost, which is expected to be between \$1,700-\$1,800 and includes transportation from Las Vegas to Lees Ferry, guide fee and tip, guidebook, lodging on the evening of June 7, food and drinks while in the canyon, helicopter ride out, and private plane back to Lees Ferry or Las Vegas. HGS members and guests will have priority only until the end of 1997. For more information, contact Dave Lazor, 5950 Beaudry Dr., Houston, TX 77035.

Joe J. Litehiser, BA'69, has been elected secretary of the Seismological Society of America for 1997-98. He continues to work for Bechtel Civil/Minerals Inc., based in San Francisco.

Patricia Merkley, MS'91, resigned from a position with Exxon and is now teaching at the Jasper campus of Vincennes University and at the Evansville campus of Ivy Tech College. Patty now lives in her home town of Huntingburg.

Anthony D. Owens, MA'83, was observed by this editor speaking, on May 21, on the CNN Headline News Network. Tony, who works for Cam Scan Inc. near Pittsburgh, Pa., described the testing with his company's scanning electron microscope of bullets fired with the gun of James Earl Ray, the convicted assassin of Martin Luther King Jr.

Douglas M. Montgomery, BS'82, continues as proprietor of Montgomery Environmental Inc., of Seymour, and reports that the volume of consulting work is very large. Doug and his wife, Martha, have three sons: David (5), Sam (2), and Jonathan (16 mo.).

Arthur N. Palmer, MA'65, PhD'69, was the 1996 recipient of the Science Award of the National Speleological Society. Art is a professor in the Department of Earth Sciences, State University of New York, Oneonta.

Charles T. Siemers, MA'68, PhD'71, is continuing his studies of Hawaiian geology and general history for a book that will bear the title *The Edge of Kauai*. Last May, he presented a paper on the character and origin of beaches on Kauai at the Cordilleran Section meeting of the Geological Society of America and has completed a paper concerned with the history of human drownings on Kauai since 1970. Chuck offers seminars at the local college on Kauai and continues his consulting practice for clients in south-eastern Asia.

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Alumni receptions

Recent alumni socials have been held in the Denver, San Francisco, and Houston areas. Some of the latter will have taken place by the time this newsletter is published. Alumni socials are held to promote fellowship within the alumni group, inform alumni about the Department of Geological Sciences, and meet visitors from the IU campus.

- The Denver social was hosted by Dick Gibson on April 18, 1996. Although the crowd was relatively small (about 25), it was an enthusiastic gathering, enjoyed by all.

- Advisory Board president Malcolm Boyce and his wife, Sylvia, hosted two socials at their home in San Francisco: the first on May 17, 1996, and the second on Aug. 9, 1997. Lee Suttner, from Bloomington, attended both events and updated the groups on happenings in the Department. The August social was a family event with several alumni and families attending and enjoying food and swimming in the Boyces' pool.

- Glenn Hieshima organized a Houston alumni social on Sept. 19, 1996, with assistance from Houston board members Stan Anderson, George Nevers, and Dan Tudor. Approximately 35 alumni, spouses, and friends attended. Lee Suttner and Susan Green attended from Bloomington. The 1997 Houston social took place on Sept. 18, shortly before the annual meeting of the Advisory Board in Bloomington (Oct. 2-4) and drew an attendance of 38.

In addition to the social gatherings, the Department, along with the College of Arts and Sciences Alumni Association, hosted alumni receptions at two annual meetings, GSA and AAPG.

- A Geological Society of America reception was held on Monday evening, Oct. 28, 1996, at the Hyatt Regency Hotel in Denver. This reception, usually the largest of the two national receptions, attracted approximately 120 alumni, spouses, and friends. A good number of IUB faculty members attended.

- On Oct. 20, 1997, a similar reception was held during the annual meeting of GSA in Salt Lake City, with about 75 persons attending.

- The American Association of Petroleum Geologists reception was held at the Hyatt Regency in Dallas on April 7, 1997, with approximately 35 alumni and guests in attendance.

Hoosier Geologic Record

This newsletter is published annually by the Indiana University Alumni Association, in cooperation with the Department of Geological Sciences and the College of Arts and Science Alumni Association, to encourage alumni interest in and support for Indiana University. For membership or activities information, call (800) 824-3044 or e-mail ialumni@indiana.edu.

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Editor David Towell
Editorial Assistant Sarah Burton
Photography Barbara Hill

College of Arts & Sciences
Dean Morton Lowengrub
Director of
Development Susan Dunn Green

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THE
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CALL FOR CONTRIBUTIONS

IUGFS 50th Anniversary

The 50th anniversary of the IU Geologic Field Station in 1999 will be marked by publication of a yearbook-style commemorative volume. We are now actively soliciting photos and stories from all IUGFS alumni as contributions to this book, which will be available in spring 1999 for less than \$50 per copy.

The volume will have sections on the history of the Field Station, as well as (we hope) sections for every class since 1949. If you know Field Station alumni who are not graduates of Indiana University, please share this information with them. The book will be pre-sold (probable deadline: December 1998) so that we can produce the most cost-effective press run.



This project is being handled by Dick Gibson — with assistance from Melody Holm and Tom Howald — who would like to hear from you soon if you have photos or stories.

Contact Dick Gibson at:

- P.O. Box 523
Golden, CO 80402
- Phone/fax (303) 278-0867
- E-mail rigibson@earthlink.net



Wherever you are, you can find IU friends, classmates

“Whatever happened to Bill West, that guy who made us all laugh in physics lab?” If you’ve ever wondered about a former IU classmate in the years since “real life” took you on your separate paths, your chances of finding him or her just increased enormously. Alumni can now locate and communicate with each other over the Internet, thanks to Indiana University’s Alumni Network.

In February, Indiana University launched the Alumni Network, an online directory that alumni can access via the World Wide Web. The network provides a new and invaluable means for alumni to keep in touch with IU, as well as to renew or make contact with their classmates. “It’s going to enable alumni to find other alumni in any given area and to find old friends,” says William West, BA’96, executive director for Alumni/Foundation Information Systems.

Alumni can access the entire network of Indiana University’s nearly 400,000 alumni by subscription only, but there is no charge for the service. To subscribe, alumni agree to make their public information available to others using the network. Public information includes name, home address, work address, degree and graduation date, spouse name, e-mail address, and home page URL. Phone numbers are not made available. Network data comes from the IUAA alumni records system.

All IU alumni and friends may access the online system to look up their own records and amend or change personal information. However, only subscribers may search the network for other alumni — either individually or in groups — by name, school, degree, graduation date, and current location. If a search finds another subscriber, the entire public record for that individual will be displayed. The only information provided for a non-subscriber will be name, degree, and graduation date. Subscribers may contact each other directly from the Alumni Network via their e-mail or home page links.

The idea for the network was developed by alumni relations offices within several IU schools in response to requests from their alumni. The completed project is the result of a cooperative effort by Indiana University, the IU Alumni Association, and the Alumni/Foundation Information Systems.

The address for the Alumni Network is www.alumnet.indiana.edu. Alumni can also access it via the IUAA web site at www.indiana.edu/~alumni.

The Indiana Alumni Network — a service whose time has come:

- It’s free!
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- Subscribe and unsubscribe any time!

Alumni news

(continued from page 20)

Victoria Warren, BA’82, MS’85, has left Andrews Engineering of Indianapolis and is now employed by Allied Waste Industries Inc., Alsip, Ill. Allied is the fourth largest waste management company in the U.S. Vicki is director of hydrogeology for the firm and travels extensively. She is responsible for more than 55 landfill sites, and deals with groundwater issues, including monitoring the quality of water flow from sites and remediation of problem situations.

William Wayne, MA’50, PhD’52, and his wife, **Naomi**, of Lincoln, Neb., donated to the Sycamore Land Trust a 12-acre woodland on the west side of Monroe County. It is to be known as Wayne Woods. Bill worked many years for the Indiana Geological Survey and was instrumental in the development of the first Monroe County plan. The Waynes are naturalists who used the property for field studies and as an outdoor lab for Scouting programs. They intended to keep the property as a nature preserve and believe that the Sycamore Land Trust

will satisfy their wishes not to see the property developed. The site is full of sinkholes, abounds with wildlife, and will be used as a pocket park.

Stephen G. Wells, BS’71 is the 1997 recipient of the prestigious Kirk Bryan Award of the Quaternary Geology and Geomorphology Division of the Geological Society of America. Steve is currently Director of the Desert Research Center, Reno, Nev.

Larry D. Woodfork, BS’64, MA’65, was named the fourth John T. Galey Memorial Medalist of the Eastern Section of the American Association of Petroleum Geologists on Oct. 13, 1996, in Charleston, W.V. The Galey Memorial Award, the highest award bestowed by the section, is intended to recognize distinguished geoscientists whose outstanding accomplishments and contributions to the profession and their application have been directed toward the betterment of society. Larry was further honored by presenting the John T. Galey Memorial Address at the opening session of the annual meeting of the section. He continues to serve as director and state geologist for the West Virginia

Geological and Economic Survey and is 1997–98 president-elect of the Association of American State Geologists. Larry received the Richard Owen Award of the Department of Geological Sciences in 1992. On a family note, Larry’s oldest daughter, Karen, after completing a post-doctoral appointment at the University of Virginia Medical School, is holding a tenure-track appointment in the biology department at Washington & Jefferson College in Washington, Pa. His younger daughter, Jessica, is currently pursuing doctoral studies in counseling psychology at West Virginia University.

In memoriam

We have learned of the recent deaths of several alumni and extend our condolences to their families and friends. Included are **Lawrence R. Lebauer**, MA’58, PhD’62, of Merion Station, Pa.; **Preston McGrain**, BA’40, MA’42, of Lexington, Ky.; **Daniel Richard Rodriguez**, BS’57, Annandale, Va.; and **Vance Patrick Wiram**, MA’70, of Cory, Ind.

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The best way to **stay connected to IU** is through membership in your Alumni Association. Your membership dues help fund *Hoosier Geologic Record*, and programs such as scholarships, Homecoming and reunions, Good Friends (student mentoring in Indiana's public schools), more than 100 IU alumni clubs worldwide, and Mini University.

You'll receive great benefits, including the IU credit card, group insurance, and discounts on restaurants, rental cars, interstate moving, long-distance phone service, and Internet access. You'll also receive a subscription to INDIANA ALUMNI MAGAZINE.

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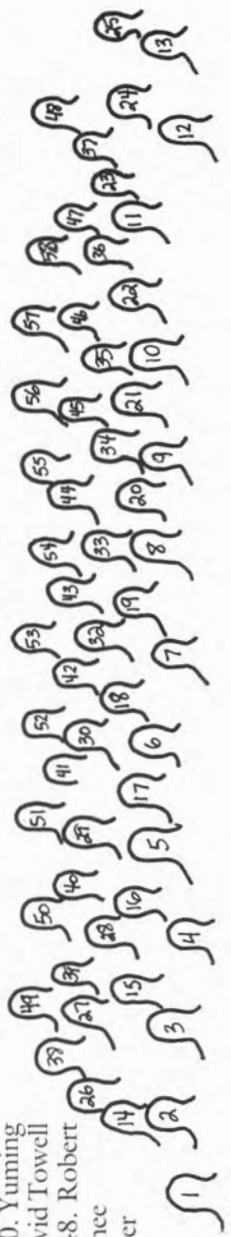


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