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Indiana University College of Arts and Sciences-Graduate School

# HOOSIER GEOLOGIC RECORD

Alumni Newsletter of the Department of Geological Sciences

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October 1993

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## GREETINGS TO ALUMNI AND FRIENDS

Academic year 1992-1993 in the Department has been one of growth in the size and distinction of our teaching and research efforts, enhancement of our laboratory and teaching facilities, and revitalization of activities involving our alumni. I am pleased to be able to share with you some of the details of this good news in my greeting to you in this year's Newsletter.

On the teaching front, our number of undergraduate majors has increased by over 50 percent in the past two years. Our graduate enrollment is now the highest among strictly geology departments in the Big Ten. We have been honored with the selection of two of our courses for inclusion in the College's new prestigious Core Curriculum. Although we still rank among the lowest ten percent of Departments in the College in terms of numbers of students and credit hours taught, we have recently introduced four new 100-level courses for non-majors and we are projecting a 40 percent growth in number of non-majors taught in the next 2-3 years. If we experience continued growth in number of undergraduate majors, enrollments in 200-400 level courses hopefully will increase to the same degree. This year we had to have near capacity enrollments in G429 at the Geologic Field Station, just two summers after we had our lowest enrollments in about the last 30 years.

Our research expenditures in the past fiscal year totalled nearly \$1.5 million, excluding over \$400,000 received from the National Science Foundation and Keck Foundation for purchase of the new electron microprobe. This total places us within the top four of geology departments in the Big Ten. Our 24-person faculty published over 48 major articles in refereed journals last year and presented over 100 talks at national or international meetings or seminars. The prestige of our faculty is reflected by the fact that many have been selected to serve in editorial capacities for major journals or as officers, counsellors, or committee persons for professional societies and as panel members for judging proposals for organizations which award research grants.

The three-quarter million dollar renovation of the geochemistry, geophysics, and petrology laboratories begun last fall should be complete by the start of this academic year. A proposal has been submitted to NSF for matching funds for an additional \$200,000 for renovation of the biogeochemistry laboratories, which, because of a budget shortfall, could not be included in the first phase of

construction. Included in this project are plans for installation of a cold-storage core laboratory. A second proposal is pending within the University for a computer cluster laboratory on the second floor. Installation of the fully-equipped laboratory with about 25 workstations will cost approximately \$200,000. Also, we just learned that the University Classroom Committee has selected the first-floor lecture rooms in the Geology Building as the highest priority classrooms on campus to be upgraded with funds that are expected to become available within the next six months.

Last year's reorganization of the old Alumni Council into the new Advisory Board was accompanied by a variety of new alumni initiatives, including hosting of alumni receptions in Houston and Denver, circulation of a questionnaire to alumni concerning their learning experiences at Indiana University, and involvement in Department development efforts and fund-raising. This coming year the Board is charged with assisting the Department in locating sources of equipment, including computer software and hardware, organizing a "Geoscience Career Day" for our students, establishing an alumni network that our students can more easily tap into for their employment search, exploring opportunities for closer linkage of our research programs with those in industry, and beginning a person-to-person contact with other alumni to assist in fund raising for the Department.

In no small part because of the efforts of the Advisory Board, the number of individual donors to the Department increased over 90 percent in the past year and the total of their contributions increased by over 50 percent. However, these increases will do little more than offset the decrease in corporate gifts we expect to see in the coming year related to the continued cutback in support of academic programs by the energy industry. We need your support if we wish to continue many of our special programs, such as student travel and research grants, scholarships, short courses, visiting lecture series, faculty-travel grants, field trips, and teaching awards. These are the special things that keep the spirit and morale of our academic community high. Please help us to maintain these activities through your personal gifts.

We continue to have an optimistic vision for the future of the Department. We have been authorized to recruit an environmental geoscientist and are searching for someone whose research focuses on the quantitative evaluation of chemical, physical or biological processes and mechanisms in surface and near surface systems. With the help of the Advisory Board we are looking into

how to raise support for major endowments to underwrite post-doctoral appointments and faculty chairs and to solicit contributors to partially offset the cost of expensive high-tech classroom-teaching equipment, as well as additional facilities enhancement both within the Geology Building and at the Geologic Field Station. If you have ideas or suggestions that you would like to share with us bearing on our future, I encourage you to write or contact me or a member of the Advisory Board.

On behalf of all of our faculty, students, and staff I express thanks for your support and interest in the Department. Do stay in touch with us and other alumni. If you live in the New Orleans, Dallas, Houston, Denver, or Indianapolis areas, watch for announcements of upcoming alumni receptions. Remember that the Department always hosts a reception at the annual national meetings of AAPG and GSA (Boston, October 25). I look forward to seeing you at one of these events or in Bloomington should you visit the campus sometime in the future.

Lee J. Suttner  
Chair

## DEPARTMENTAL NEWS

### *RICHARD OWEN AWARD*

The 1993 **Richard Owen Award** presented to a graduate of the Department who has distinguished himself or herself in either industry/government or academia was awarded to **Charles E. Wier** (A.B., '43; A.M., '50; Ph.D., '55). Charles rose from coal exploration projects manager with AMAX International Coal, Inc. to become vice president before his retirement in 1985. He currently is a consultant in coal geology to AMAX as well as vice president of Hoosier Mining Co. which is investigating mining ventures for gold in Liberia. Prior to joining AMAX, Charles was head of the Coal Section of the Indiana Geological Survey and Professor of Geology at I.U. Bloomington. He currently is Adjunct Professor. Included among his numerous positions are: Chairman, Group of Coal Geology, the Geological Society of America, 1961; President, Indiana Coal Mining and Technical Society, 1964; Chairman, North-Central Section, G.S.A., 1967; President, Illinois-Indiana Section AIPG, 1986; National Treasurer, AIPG, 1987; Chairman, Coal Committee, Energy Minerals Division, AAPG, 1988-90; and recipient of the Gordon H. Wood, Jr. Memorial Award in Coal Geology, Eastern Section AAPG and EMD, 1990. Charles

received the Owen Award on March 8 and delivered his colloquium address: "Perspectives on Education and Opportunities in Geology."



Lee J. Suttner (left) and Richard Owen Award winner, Dr. Charles Wier (right)

As discussed above by **Lee Suttner** in his message, major laboratory and classroom renovation continues. The new petrology lab is now in Room 338 and ready for a bumper crop of students for optical mineralogy this fall. The mineralogy lab, Room 245, has been painted. Mark Gilstrap's analytical geochemistry lab has moved to Room 406. New geophysics facilities, including an enlarged (and carpeted) geophysics computing lab, drafting/work area, library/meeting room, student and

visitor office space, electronics shop, and undergraduate teaching lab are now well toward completion. A new geophysics computer system includes a Sun Sparc 10 with about 4 gigabytes of disk space, tape drives, etc.

**Constance Work** donated her lifetime collection of mineralogical specimens to the Department in 1989. She was the wife of **James Work**, a professor of English at Indiana University. Many of the pieces in her collection were purchased from dealers and at gem shows throughout the U.S. While not field-collected, many of the items are quite distinctive examples, exhibiting outstanding representational coloring. As a means of ensuring that part of the collection would be displayed, **Anne Perley**, a sister of **Constance Work**, provided funds to purchase a wall display case. **Don Hattin** and **Lisa Rhoades** were instrumental in moving specimens into display cases. Several of the small, colorful specimens are displayed in the lighted wall cabinet near the mineralogy teaching labs on the second floor. The larger pieces of the collection are displayed in a lighted, glass case in the northwest corner of the Geology Lobby and will be rotated from time to time. The most distinctive arrangement of specimens is in a large, lighted inset wall case across from the Chair's office in the Geology building. We very much appreciate the generosity of **Constance Work** which has made these exhibits possible.

A short course on paleosols was given in the Department on January 16 by **Greg Mack** (M.A., '75; Ph.D., '77) of New Mexico State University and **Cal James** (Ph.D., '77) of Ohio State University. This course was previously given at the Cincinnati GSA meeting. The day-long session on this hot topic in sedimentology and stratigraphy was a big success and made possible by grants to the Department from BP and Exxon. Their support is greatly appreciated.

Professor **Michael Savarese** represented the Department at the annual Physics and Astronomy Open House for high school science students and their teachers held on October 10. Mike presented a talk entitled "Asteroid Impact and Dinosaur Extinction -- Do We Have a Smoking Gun?"

Undergraduate majors in the Department now number 68 and graduate student enrollment now stands at 75 with 37 students working on Ph.D. degrees and 38 on M.S. degrees (3 of which are special degrees). We have 21 associate instructors, 12 research assistants, 4 graduate student fellows, and 6 post-doctoral research associates. A new degree option approved by the faculty is a Ph.D. minor

in environmental science. Especially appropriate for this minor are courses taught by faculty members in the School of Public and Environmental Affairs who have joint faculty appointments in Geological Sciences (i.e. Professors **Hendrik Haitjema** and **Jeffrey White**).

In the fall, oil company representatives **Mark Northam** of Mobil Oil Company (October 13) and **Don Lipinski** and **Linda Hubner** of Shell Oil Company (October 15, October 23, respectively), visited the Department. These company representatives interviewed students interested in employment in the energy industry and gave group presentations on exploration, production, and research activities as well as employment opportunities in geology and geophysics. Following presentations, they hosted informal gatherings at Nick's English Hut. Don returned in the spring semester with **Mark Hempton** of Shell who gave a departmental colloquium address (see below).

Interviews by environmental companies began in the fall with the visit by **Michael Graham** (M.A., '78; Ph.D., '83) of Battelle Pacific Northwest Laboratories. This was followed in the spring with visits and interviews by representatives of the following companies: **Chris Smith** (M.A., '83) of Harding and Lawson Associates; **Dick Gibson** (B.S., '71) of Gibson Consulting; **Glenn Brooks** of Weston, Inc.; **Conrad Banazak** of Geraghty and Miller, Inc.; and **Roy Funkhouser** (M.A., '83) of Law Environmental. We're especially pleased to have these and other environmental companies visit the Department and interview our students.

Undergraduate and graduate students have been very busy in the past year with departmental activities. In October, a new student newsletter, Geosci, appeared. Its purpose is to inform Geology faculty, staff, graduate students and undergraduate students of academic and social events. One feature has been a "Research Spotlight" section in each issue which focuses on the research activities of a faculty member. Four more issues followed during the academic year. Sigma Gamma Epsilon (SGE)/ Geology Club sponsors the newsletter. These student organizations have now been merged so that formal membership into SGE is not required for participation in the overall organization. One new activity has been the adoption of a state highway for clean-up, the stretch of State Highway 46 between College Avenue and the Highway 37 bypass on the west. Attractive signs note this at both ends of the highway.

SGE/Geology Club sponsored a faculty research forum in October. Numerous faculty members and research scientists gave 10-minute presentations on their current research projects. This provided an excellent opportunity for students and faculty alike to learn about current research in the Department. The organization also co-sponsored one colloquium and fully sponsored a second talk during the spring semester. Co-sponsored was the presentation by Professor **Donald Siegel** of Syracuse University who gave the GSA Birdsall Distinguished Lecture on February 24 and SGE/Geology Club also sponsored the talk by graduate student **Clifford Ambers** on April 19 (titles of talks appear below). The Club also hosted post-talk receptions for visiting speakers during the spring semester in the "Elephant Room" (S201) of the Indiana Geological Survey.

A major student highlight this year was the culmination of their efforts to have a student lounge. New carpeting has been installed in Room 136; new and used furniture items are in place. The lounge now provides a convenient location for all geology students to meet and socialize with their peers.

*1992-93 Department Colloquium Series:*

- Sept. 7, **Dr. Colin Harvey**, Indiana University: "Mineralogical and Geochemical Studies in the Wairakei Hydrothermal System in New Zealand"
- Sept. 14, **Dr. Haydn Murray**, Indiana University: "Brazil - A World-Class Bauxite and Kaolin Province"
- Sept. 21, **Dr. Michael Underwood**, U. of Missouri: "Thermal Overprint in Accretionary Prisms: Examples from the Shimanto Belt and Franciscan Complex"
- Sept. 24, **Mr. Larry Woodfork**, West Virginia Geological Survey (Owen Lecture): "Geologists and Professional Ethics"
- Oct. 5, **Dr. Robert W. Wintsch**, Indiana University: "The Alleghanian Orogen in Southern New England: A Place to Build Bridges between Crystalline Sources and Foreland Sediments"
- Nov. 2, **Mr. David Smith**, Chevron Exploration and Production Services: "Computer Applications to Geologic Problems at Chevron"
- Nov. 9, **Dr. Peter Braendlein**, Indiana University: "First Data on the Weathering Geochemistry of Minnesota River Valley Crystalline Rocks"
- Nov. 16, **Dr. William Thomas**, U. of Kentucky: "Regional Paleozoic Tectonics of the Southern Margin of North America"
- Nov. 30, **Dr. Hou Hong-fei**, Chinese Academy of Geological Sciences: "Event Stratigraphy around the Devonian-Carboniferous Boundary in West Europe and South China"
- Dec. 10, **Dr. Richard Alexander**, Rider College: "Burrowing Rates of Bivalve Species and Their Distributions across Sediment Texture Gradients"
- Jan. 18, **Dr. Michael Hamburger**, Indiana University: "Space Geodesy: A New Revolution in the Earth Sciences?"
- Jan. 25, **Mr. David C. Voelker**, USGS, Indianapolis: "Activities of the Water Resources Division of the U.S. Geological Survey in Indiana"
- Feb. 8, **Dr. Shan L. De Silva**, Indiana State University: "Volcanism and Magma Genesis in the Central Andes"
- Feb. 15, **Mr. Tony Fleming**, Indiana Geological Survey: "The Late Wisconsin Evolution of the Maumee Lacustrine Basin, Northeastern Indiana"
- Feb. 24, **Dr. Donald Siegel**, Syracuse University (Birdsall Distinguished Lecturer, Geological Society of America): "Effects of Continental Glaciation on Ground-Water Chemistry: From Dilution to Pollution"
- Mar. 1, **Mr. Mark R. Hempton**, Shell Oil Company: "Cuba-Bahamas Arc/Margin Collision: Constraints on Timing of Suturing"
- Mar. 8, **Dr. Charles E. Wier**, Amax Coal Company (Owen Lecture): "Perspectives on Education and Opportunities in Geology"
- April 1, **Dr. Mary Jo Baedecker**, USGS, Reston (Henry Darcy Distinguished Lecture, Association of Ground-Water Scientists and Engineers): "The Fate of Organic Compounds and Geochemical Processes in Contaminated Aquifers"
- April 5, **Dr. Indu D. Meshri**, Amoco Production Company (AAPG Distinguished Lecture): "Total Basin Modeling: An Exploration Tool for Frontier Basins"
- April 12, **Dr. Michael Savarese**, Indiana University: "Biomechanics and Its Application to Paleontology and Paleoecology"
- April 19, **Mr. Clifford Ambers**, Indiana University: "The Nature and Origin of Very Well-Crystallized Kaolinite (VWCK)"

*Additional Seminars, Brownbag Talks, and Special Presentations:*

- Aug. 28, **Dr. Lu Yaoru**, Chinese Academy of Geological Sciences: "Karst Research in China and Some Environmental Concerns"

- Sept. 9, **Dr. N. Gary Lane**, Indiana University: "Cladistics of Paleozoic Superfamily Playtrinitacea (Crinoidea, Echinodermata)"
- Sept 16, **Dr. Ronald Seavoy**, Consultant: "The Quarrying, Shaping, and Marketing of Indiana Limestone"
- Sept. 22, **Dr. Michael Underwood**, U. of Missouri: "Patterns of Sediment Dispersal in Modern Trenches"
- Sept. 23, **Dr. Erik Kvale**, Indiana Geological Survey: "Pennsylvanian Footprints from the Crane Naval Facility"
- Oct. 7, **Dr. J. Robert Dodd**, Indiana University: "An Alaskan Odyssey"
- Oct. 12, **Dr. George D. Klein**, U. of Illinois: "Pennsylvanian Cyclothem and Sea-Level Change: How Much Tectonic? How Much Climatic Change? Does it Matter?"
- Oct. 14, **Mr. Chris Gellasch**, Indiana University: "Ypsilanti Commons Environmental Audits and Site Remediation"
- Oct. 21, **Dr. Vishnu Ranganathan**, Indiana University: "Subsurface Dissolution Rates and Constraints on Macroscopic Permeabilities in the Illinois Basin"
- Oct. 21, **Mr. Louis Bucklin**, Indiana University: "Early Cambrian Reefs, Bioherms, and Corals: A South Australian Adventure"
- Nov. 2, **Mr. David Smith**, Chevron Exploration and Production Services: "Recent Methods for Determination of Seismic Velocities in Exploration"
- Nov. 10, **Dr. Larry Frakes**, U. of Adelaide, Australia: "Phanerozoic Climate Change and its Relation to the Carbon Cycle"
- Nov. 10, **Dr. Michael Graham**, Battelle Pacific Northwest Laboratories, Richland, Washington: "Career Opportunities in Environmental Studies and Hydrogeology"
- Nov. 11, **Mr. Nelson Shaffer**, Indiana Geological Survey: "Geology and Biotechnology"
- Nov. 17, **Dr. William Thomas**, U. of Kentucky: "Transverse Zones in Thrust Belts"
- Nov. 18, **Dr. Bruce Douglas**, Indiana University: "Application of Subcritical Crack Propagation to Common Geological Processes"
- Dec. 2, **Mr. Armin Fluegge**, Indiana University: "How to Estimate Ancient Atmospheric Carbon Dioxide"
- Dec. 4, **Dr. Lenore Tedesco**, IUPUI: "The Effects of Hurricane Andrew on the Coastal and Marine Environments in South Florida"
- Dec. 17, **Dr. Emeka Ekweozor**, U. of Ibadan, Nigeria: "Petroleum Potential of Cretaceous and Tertiary Strata in the Niger Delta and Benue Trough, Nigeria"
- Dec. 23, **Dr. P. Sundararaman**, Chevron Canada Resources: "Activation Energies of Processes in the Breakdown of Kerogen"
- Jan. 20, **Dr. Enrique Merino**, Indiana University: "How Stylolites Get Their Transform Faults"
- Jan. 27, **Dr. John Jasper**, Indiana University: "Estimated CO<sub>2</sub> Levels from Photosynthetic <sup>13</sup>C Fractionation in the Central Equatorial Pacific Over the Last 255,000 Years"
- Jan. 29, **Dr. Miguel Goni**, Woods Hole Oceanographic Institution: "Biomarker and Isotopic Approaches to Characterize and Quantify Terrestrially-Derived Organic Matter in Marine Sediments"
- Feb. 3, **Dr. Lisa Pratt**, Indiana University: "Reconstructing Paleoceanographic Events during the Mid-Cretaceous"
- Feb. 10, **Mr. Kirsten Leckrone**, Indiana University: "An Interferometric Method for Determining ppm-Level Changes in Atmospheric Oxygen"
- Feb. 24, **Dr. Yifeng Wang**, Indiana University: "The Effect of Seasonal Climate Changes on Calcrete Formation"
- Mar. 3, **Ms. Kathy Schick and Nick Toth**, Indiana University (Anthropology): "The First Rock Breakers: The Dawn of Human Technology"
- Mar. 10, **Ms. Jenny Becker**, Indiana University: "Isotopic Evidence for Pre-Taconic Metamorphism, Potomac Terrane, Washington, D.C."
- Mar. 10, **Ms. Julie Boyd**, Indiana University: "Evidence for Polymetamorphism in the Bronson Hill Terrane, Central New England"
- Mar. 10, **Mr. Brad Hellickson**, Indiana University: "Evidence for Multiple Reactivations along the Eastern Border Fault of the Southern Hartford Basin, Connecticut"
- Mar. 11, **Mr. Matthew J. Mikulich**, Chevron Corporation: "Geophysical Results in Certain Key U.S. Explorations Trends. It's the Data"
- Mar. 23, **Dr. Robert Nicoll**, Australian Geological Survey, Canberra, Australia: "A Conodont's Eye View of the Evolution of Australia, From the Cambrian to the Triassic"
- Mar. 24, **Dr. Robert Nicoll**, Australian Geological Survey, Canberra, Australia: "And Just Exactly What is a Conodont or What We Know About Those Little Whatizts Now"
- Mar. 24, **Dr. J. Robert Dodd**, Indiana University: "Anatomy of the Grainstone Shoal Facies of the Salem Limestone (Mississippian) of Southern Indiana"

- Mar. 31, **Mr. Todd Moody and Mr. Roy Funkhouser**, Law Environmental, Inc.: "Environmental Risk Assessments"
- April 7, **Mr. Ron Evans**, Indiana University (Chemistry): "Tandem Quadrapole Mass Spectrometers: An In-Depth Look"
- April 8, **Dr. Gary R. Olhoeft**, USGS, Denver: Geophysical Observations of Geological, Hydrological, and Geochemical Heterogeneity"
- April 21, **Dr. Yutian Wang**, Changchun University of Earth Sciences, China: "Coupled Replacement Cement-Congruent Dissolution Dynamics and its Modeling in Laterization"
- April 28, **Dr. J. Robert Dodd**, Indiana University: "Carbonate Seminar, G707"

## GEOLOGIC FIELD STATION

The forty-fourth summer at the Geologic Field Station (1992) was a good one. Enrollments increased markedly in both Option I (55 students) and Option II (45 students). G111-G112 was somewhat lower with ten participants. The Alumni College was again held in late August with a single session attended by 15 persons. Professors **Gary Lane** of I.U. and **Tom Straw** (B.S., '58; M.A., '60; Ph.D., '68) Western Michigan again did a great job for the enthusiastic participants. The weather did not fully cooperate in 1992 as it had in 1991. A snow storm hit which made the overnight camping outing to Lost Cabin Lake a major challenge, but the storm did create a truly spectacular and memorable setting.

Again, the final formal activity at the Field Station was the field seminar for Amoco geophysicists and geologists led by **Lee Suttner**. Discussions are continuing with Amoco and also with Battelle Northwest Laboratories about the use of satellite imagery, enhanced photo coverage of the Field Station study areas, and the ground truth checking of photo geologic maps. Our efforts will be accelerated if Congress authorizes funding of the recent legislation aimed to support geologic mapping on a national scale and to include those universities that teach geologic mapping.

The summer of 1993 has seen continued growth in enrollments at the Station. Enrollments in both Option I and Option II of G429 are over 60. **Abhijit Basu** again taught our introductory courses, G111-G112 with enrollment of 14 students. Alumni College enrollment has also held firm for the one-week session at the end of August.

A special event held at the Field Station this summer was the 1993 Field Conference of the Tobacco Root Geological Society, July 16-18. This represented the 20th anniversary of the conception of the Society which has since expanded its coverage to include much of the Northwest. The theme of the meeting was the economic and regional geology of the Tobacco Root-Boulder batholith region, Montana. The Conference included one day of technical sessions, two days of field trips, and an evening at the Field Station lodge which featured a reception, dinner, and informal fireside talks by **Dean Kleinkopf** (USGS), **Dick Gibson** (B.S., '71) (Gibson Consulting), and **Karl Kellogg** (USGS).



On the way to Field Camp (Motel at Sheridan, WY). L to R: Dick Wright, Paul Cummings, Jim Christianson, Steve Cohen, Lyndon Dean. Bob Laney in center front. June, 1959. (Contributed by Robert L. Laney)

## INDIANA GEOLOGIC SURVEY

On November 21, two in-situ trackways produced by a primitive reptile were discovered in Lower Middle Pennsylvanian strata in Warren County, Indiana by a group led by **Erik Kvale** and by **Joe Devera** of the Illinois State Geological Survey. The trackways were found in the same general area from which similar fossils were collected by **John Collett** more than a hundred years ago.



A summary report of the Cincinnati Arch Consortium (CAC) study *The East Continent Rift Basin: A New Discovery* was jointly published by the Indiana, Kentucky, and Ohio Surveys. Indiana Geological Survey geologists **Brian Keith** and **Lloyd Furer** are among the co-authors of the publication. In connection with this study, a theme session (Proterozoic Rift Basins of North America) was held at the national Geological Society of America meeting in Cincinnati on October 29. **Brian Keith** and representatives of the Kentucky and Ohio Geological Surveys were co-conveners of the session.

In the Geochemistry Section, the sampling and chemical analysis phase of two projects to assess the levels of radon, methane, and priority pollutant trace metals in ground water from glacial aquifers in LaPorte and Porter Counties was completed. This study was a cooperative project with the Environmental Geology Section, two other state agencies, and two university research groups: Indiana State Department of Health (ISDH), Indiana Department of Environmental Management (IDEM), Indiana University School of Public and Environmental Affairs (SPEA), and Ball State University Chemistry Department (BSCD). The Survey functioned as the lead agency.

Porter County is the site of three projects of the Environmental Geology Section: (1) **Ed Hartke**, Head of the Environmental Section, and **Greg Olyphant** of the Department of Geological Sciences are working on a dunes drywell leachate study at Beverly Shores on Lake Michigan; (2) **Ned Bleuer** is conducting an aquifer sensitivity study; and (3) **Ed Hartke** and **Ned Bleuer** completed work on the chemical analysis of ground water from glacial aquifers that was conducted in cooperation with the Geochemistry Section. A chemical analysis of ground water was also conducted in LaPorte County, with work being done by **Nancy Hasenmueller** and **Ned Bleuer**.

Projects of the Environmental Geology Section continuing from last year include ground water vulnerability studies in Marion and Allen Counties by **Tony Fleming** and **Steve Brown**; an earthquake risk study in Evansville by **Don Eggert**; collection of evidence of a prehistoric earthquake centered near Vincennes by **Ned Bleuer**; and coal mine reclamation studies at the site of the abandoned Friar Tuck surface and underground coal mines in Sullivan County by **Denver Harper**.

**Sam Frushour**, of the Physical Facilities and Field Services Section, and **Mike Savarese**, of the Department of Geological Sciences, went to Key Largo, Florida, last Fall to conduct a physical analysis of ballast stones on the El

Lerri shipwreck.

**Rick Hill** of the Technology Transfer Section has installed a Novell network that is being shared with the Department of Geological Sciences. The network provides an easy-to-use internal mail system that is connected to Internet, a full data backup system and cost-cutting network versions of application programs; it also provides for the sharing of peripheral devices (such as laser printers) among several users. With the assistance of **Paul Irwin** the Section is also developing databases and geographical information system. Two large-format digitizers are available to Survey and Geosciences personnel for inputting data into the GIS.

A Survey publication, "Geology for Environmental Planning in Monroe County, Indiana," by **Ed Hartke** and **Henry Gray** was named winner of the John C. Frye Award at the GSA convention in Cincinnati last October. This national competition honors the best paper in the field of environmental geology published by the GSA or by the Association of American State Geologists during the last three years. Also earning high distinction was **Carl Rexroad**, Senior Scientist and Professor of Geological Sciences (part-time) who was awarded the Pander Society Medal for outstanding contributions to the study of conodonts.

## FACULTY NEWS

The following tribute to Professor **John B. Droste** was written by **Bob Shaver** in honor of John's retirement in December 1992.

*John B. Droste*

Collector of outstanding teaching awards. One of the few most knowledgeable persons for Indiana geology. Dedicated server of his profession and fellow man. Versatile researcher across a broad spectrum of earth science. Masterful speaker whose stentorian quality provokes contagious enthusiasm for his subject. Exemplar of admired family and community values.

From freshman students, through departmental colleagues, and to the higher administration, Indiana University has been fortunate to have this man, **John Brown Droste**, in its midst since 1956, thirty-seven years all told. Rather than regretting his retirement, all will join in celebration of his career.

**John Droste** was born a prairie boy, at Hillsboro in western Illinois in 1927. His growing-up family was one of strong traditional values, one that revered the living grandparents, and one that gained strength, not weakness, through the exigencies of the Great Depression years. He served in America's armed forces at and after the end of World War II. He attended various colleges but received his three geological degrees from the University of Illinois at Champaign-Urbana, the doctoral degree being conferred in 1956. And he married his hometown girlfriend, **Mary Anderson Droste**. To this union came two sons and two granddaughters. John and Mary exude the personal qualities that make them treasures as neighbors, social respondents, and good friends.

With regard to his geologic career, versatility, reliability, and excellence are John's middle names. Perhaps he achieved his greatest acclaim as a teacher. He collected such teaching recognitions as the Indiana University Chapter of the Society of Professional Journalists' Brown Derby Award, the Eastern Section of the American Association of Petroleum Geologists' Outstanding Educator Award, and various firsts by student groups. As the student system rated him, he truly was a five-star teacher. Greater compliments could hardly be realized than those that came through such student adjectives and other kinds of accolades as "incredible professor," "fabulous teacher," "entertaining," "his great sense of humor," "a marvelous class," "his enthusiasm is contagious," "a tremendous course so masterfully presented," and "I was totally enthralled by the history and processes of the earth as you unfolded them before my eyes...I then decided to pursue a career in earth sciences..."

More than 35,000 students passed through John's 100-level geology courses! But his praises were not restricted to those from freshmen. They also came profusely from his adult education classes, including those in the Mini-University, from correspondence students, from upperclassmen and graduate students, and from officials in the University's Junior Division.

John had a deep feeling of need to perform service. This sense of responsibility spilled over from his department and the University right out into the community and to his profession at large. No greater proof at the department level need be cited than the many, many years during which he discharged patiently and competently the tedious offices of scheduler of classes, chief registration official, and head ministrant of associate instructors' duties. One facet of his service both merged with and extended from his regular teaching assignments. He conducted summer institutes for

high school teachers sponsored by the National Science Foundation, and he was a frequent lecturer in the Mini-University. For many years, he offered the Department's only correspondence course, and, yes, he received correspondent's accolades, including from one doing 36 years in prison!

At the community level, the Drostes have long been very active members in the First Christian Church, wherein John has served as Board Member and Deacon. Perhaps most exemplary of his sense of community spirit are the many, many posts he has held in Boy Scouting, including in the highest post offered in Monroe and surrounding counties. His activities range from those of informal nature, such as landscaping a new camping center; into counselor for Merit Badges, scoutmastering, and numerous committee memberships; and to chairman for various district functions.

Beyond the campus and Indiana, John's professional service extended most notably to science education. He lectured in such emphasis for three years in the Visiting Geological Scientist Program, sponsored by the American Geological Institute. Therein, he delivered lectures in universities ranging from Slippery Rock in the east to California Berkeley in the west. He served on numerous panels related to teaching and education, auspices of the National Science Foundation and American Geological Institute. And he was the earth-science editor for an association of science and mathematics teachers.

How much time does a person have to achieve much more than has been related above? **John Droste** did give more time -- to an enviable research and publication career that brought forth about 80 publications. In his early professional years, he concentrated in the interrelated fields of glacial geology, sedimentation, and clay mineralogy, fields in which he also taught at advanced levels. His early papers were based, geographically, as far afield as Pennsylvania and Death Valley and ranged even into evaporite geochemistry as an example of extension from general disciplines to specialties.

In time his research interest became more focused on midwestern Paleozoic stratigraphy, particularly in the many thousands of feet of subsurface Paleozoic rocks in Indiana. Stratigraphy in the broad sense is the focal point of geology, and so John soon interfaced with several practitioners of paleontology, paleoecology, structural geology, mineralogy, and economic geology. These practitioners populated the Department and the campus-based Indiana Geological Survey, and many of John's

publications resulted from mutually complementary work with others. John himself was perhaps the main focal point in this teamwork effort to bring much light to the fascinating history secreted by the Indiana subsurface rocks ranging from the Cambrian System (500,000,000 years old) to the Pennsylvanian System (200,000,000 years old). Commercial and engineering visitors to the Survey consult him for stratigraphic detail pertinent to their special interests, colleagues consult him for the starting bases of their projects, and graduate students also rely on him for their foundations in whatever specialties.

The greater significance of John's research contribution and that of his coworkers probably rests in the fact that most of Indiana is underlain by a great structural upwarp in the earth's crust, whereas smaller parts lie in peripheral regions of two large downwarps called basins; a third basin lies just to the east of the State's eastern limits. Traditionally, the three basins have fostered their own semi-isolated studies and much too independent (for all to be right) geologic histories. During recent decades, the Indiana-centered work, which John Droste and colleagues extended with hands-on into the three flanking basins, has brought a vastly improved coherency to the state of midwestern geologic knowledge. Such progress integrates midwestern geology with newest geologic concepts being discussed at continental and global scales. **John Brown Droste** has contributed immensely to this proud state of local and regional geologic affairs, affairs in which the Bloomington Geologic community has always placed a major effort.

We may expect John to continue in his admirable ways of community and university service and to take his geologic research to an even higher level. There can be no room for regrets, therefore, at this transition time for John; rather, we celebrate an outstanding career.

\* \* \* \* \*

This year we have asked faculty to provide news, not just of a professional nature, but also to provide a personal profile of their other interests and activities.

**Abhijit Basu** was on sabbatical leave during both semesters of the 1992-1993 academic year. He spent the first semester as Visiting Professor at the University of Parma in Italy, and the second semester and part of the summer 1993 as a Visiting Scientist at the Lunar and Planetary Institute in Houston. His lunar research continues to be supported by NASA and he co-edited a GSA Special

Paper on provenance which is in press. Basu remains active in SEPM affairs serving on several committees and chairing one.

**Bob Dodd** is working with graduate student **Nadeem Ahmad** and **Todd Thompson** of the Indiana Geological Survey on sedimentary structures and sedimentology of the Salem Limestone in the Dark Hollow Quarry near Oolitic, Indiana. Bob also has worked with a research seminar on the deposits and diagenesis of an oolitic shoal exposed in quarries northwest of Orleans, Indiana. Colleagues on this project include **Nadeem Ahmad**, **Charles Zuppann**, **Mike Mitchell**, and **Brian Keith**. The Salem Limestone projects are partially supported by Marathon Oil Company.

On the personal side, Bob and Joann traveled to Alaska during June 1992 and to Ireland during May-June 1993. Bob maintains interests in growing roses, photography, bike riding, and running. Their son, Mark, works as a civilian electrical engineer at Wright-Patterson Air Force Base in Dayton, Ohio and has two daughters born in November 1990 and August 1992. Paul, their second son, will receive his Ph.D. in electrical engineering from Purdue this summer and has accepted a job with Sandia Laboratories in Albuquerque, New Mexico.

**Don Hattin** taught his two-week graduate-level course on modern carbonate environments on San Salvador Island, Bahamas during June/July 1992 which marked the ninth time this course has been taught there. In May 1993, Don led a 15-day regional geology field trip with 14 students to the Southern Rocky Mountains, Colorado Plateau, Rio Grande rift, and the western Great Plains. During October, Marge and Don flew to Italy and he attended a workshop on global cyclostratigraphy held in the charming hilltop city of Perugia, which is enclosed by a wall that has Roman and Etruscan origins. Following the meeting, they made brief visits to Florence and Rome. Just after Christmas, they traveled to Denver to visit their younger daughter, Donna, and their son, Ron, and his family. A spring trip to Bogue Island, North Carolina to visit retired friends was marred by driving into the "storm of the century." Nearly snowbound near Statesville, they continued on to experience first an ice storm, then heavy rain, and winds that neared hurricane proportions and by the time they reached Goldsboro they encountered a large area without power and crossed the bridge to Bogue Island into the teeth of the storm.

Don serves as a restoration specialist for the Indiana Railway Museum and has worked since February 1992 restoring steps, roofing and flooring of trolley car No. 313 (from Porto, Portugal) and has completely painted the body, bumpers, ironwork, etc. Other repairs have been made and No. 313 will be in service throughout the summer and fall of 1993. By the way, he collects railroad cards and stereoscopic view cards, especially ones of exceptional depth. Don writes, as time permits, and has completed several chapters of an account of a Bay State (Massachusetts) boy's youthful activities and adventures. Marge and Don are avid gardeners and keep busy with their trees, shrubs, flower beds, vegetable garden and birds.

The Hattins' older daughter, Sandy, was remarried on May 2, 1993 to Jeffrey Belth of Ellettsville. Jeff works for the "Insurance Forum" a monthly newsletter of the insurance industry. Sandy has been working in the Contracts Office of the University and for the Spencer school system in a naturalist program. Son Ron continues his anesthesia practice in Denver. Daughter Donna is a scenic artist and set decorator for the motion picture industry, and has been involved in films for theater, television, and advertising. She was set decorator for the May 4, 1993 production "The Return of Ironside." Don and Marge enjoy time with their grandson, Whitney Swain III and stepgranddaughter Devin.

**Michael Hamburger** reports on current activities in geophysics which include four major field projects in the former USSR. He will be leading a major (16 receiver, 50-participant) GPS experiment in Kyrgyzstan and Kazakhstan; **Gary Pavlis** will be operating a large seismic array in Turkmenistan; doctoral student **Rob Mellors** will be working with the digital seismic network in Kyrgyzstan; and doctoral student **Sujoy Ghose** will be doing field geology in the Kyrgyz Tien Shan. Two visiting scientists from the Russian Academy of Sciences, Drs. **Vitaly Khalturin** and **Tatyana Rautian**, leading seismologists from the Institute of Physics of the Earth, gave a series of lectures, participated in seminars, and initiated joint research projects at I.U. during the past year. Michael will be on sabbatical leave at the Institute de Geodynamique at the University of Nice in southern France for the academic year, 1993-1994.

**John Hayes, Lisa Pratt, and Simon Brassell** report that the Biogeochemical Laboratories are busy as ever including an expanding community of students, faculty, postdoctoral fellows and research staff. Research centers on the analysis and interpretation of molecular and isotopic records of carbon, hydrogen, nitrogen, oxygen, and sulfur in terms of ancient environments and biogeo-chemical

processes. Details of specific environments and global phenomena are being studied as, for example, the history of atmospheric composition and its relation to biological processes (evolution of aerobiosis, biotic control of carbon dioxide levels). To understand processes, considerable attention is given to the study of contemporary environments. A goal is to quantify ancient greenhouse phenomena and also to contribute to the field of petroleum geochemistry. **John Jasper** continues as a research scientist and postdoctoral associates include **Graham Logan** (University of Bristol), **Emily CoBabe** (Harvard University), and **Ruth Moore** (University of Waterloo).

**Alan Horowitz** continues to take his vacations in conjunction with projects, usually long term, on which he is working. This year, between semesters, he spent two weeks in Carrollton, Georgia working with **Johnny Waters** (M.A., '76; Ph.D., '78) of West Georgia College on a bibliography of the Blastoida in preparation for a proposed review of the group for the Treatise of Invertebrate Paleontology. In April, Alan spent two weeks at the National Museum of Natural History in Washington, reviewing literature, not readily available in Bloomington on Recent bryozoans for a project comparing the diversity of the Recent fauna with its fossil record.

Alan enjoys bird-watching and spends a fair amount of time during the growing season tending a yard containing a small vegetable garden. He's partial to vine-ripened tomatoes and fresh corn-on-the-cob. "On walks, I am always alert to seeing and hearing whatever avifauna is present."

His wife, Lillian, passed away in November 1992. The Perry siblings have scattered across the landscape. John is a nurse anesthetist in Peoria, Illinois. Mike has a franchise advertising business in Marietta, Georgia. Peter is a captain in the Air Force stationed at Cheyenne, Wyoming. Paula is a respiratory therapist in Columbus, Indiana.

**Noel Krothe** presented a series of invited lectures in China during the spring of 1992. Besides the academic merits of the visit, he was able to visit the Forbidden City, Summer and Winter Palaces, the Great Wall, and the famous terra cotta soldiers near the ancient city of Xian. Joyce accompanied Noel on the trip. He is anticipating a return lecture tour this fall to Guilin in South China where he hopes to develop joint research projects in the famous karst area. He will also visit the University de Roma, Italy, to complete ongoing research projects.

The Krothe family is vacationing in the Crested Butte area of Colorado this summer with activities to include backpacking, fishing, and mountain biking. Noel spends much of his free time with son Jason's sports activities and also bikes and fishes when time permits. He is active in local politics serving as a Democratic precinct committeeman and serves as vice-president of the Blue Ridge Neighborhood Association.

Daughter Kara graduated in the spring of 1992 from Smith College where she majored in government. She is presently employed at the Justice Department and Voter Registration Bureau in Bloomington as well as studying for the LSAT examinations for entrance into law school. Joseph completed his freshman year at Penn State where he is majoring in engineering. He took his first geoscience course and is thinking about changing majors. "Honestly guys, I did nothing to influence his decision", states Noel. Jason is a junior at Bloomington North. He is on the varsity basketball, track, and soccer teams. He's also a member of the Honor Society and will be a LOTS fellow his senior year.

Gary Lane has just completed a manuscript on Famennian crinoids from China which reports 23 new species and 2 new genera. He returned to China in late May 1993 where he teamed up with **Johnny Waters** (M.A., '76; Ph.D., '78) and **Chris Maples** (M.S., '85; Ph.D., '85) for continued field work at both previously visited and new sites. The three have a cooperative NSF grant to support this research. Gary gave a talk at Purdue in April 1993 where he ran into former I.U. students **Ken Ridgeway** (M.S., '86), now on the faculty there, and graduate students **Barb Lary** (B.S., '84) and **Tom Toth** (B.S., '86; M.S., '89). Gary also continues to enjoy teaching in late August at the Alumni College at the Field Station in Montana and also teaches an honors class in Bloomington on the natural history of southern Indiana. He will be on sabbatical leave in the fall (1993) but plans to attend the GSA meeting in Boston.

Gary's outside interests include work on an almanac of wildflower blooming times in southern Indiana. Gary and Mary's son, Charles, is now Assistant Professor of Physics at Drexel University in Philadelphia. He and his wife Joyce live in Swarthmore. Daughter Ann finished her MBA degree two years ago and works in the loan department of Liberty National Bank in Louisville. The Lanes' other daughter, Susan, also lives in Louisville and works as a medical technician at Kosair-Norton Hospital. Gary plans to retire in May 1995.

**Enrique Merino** reports that he liked teaching G221 (Mineralogy) for the first time this past fall (1992). The class was good as was the associate instructor, **Dorothy Payne**. Some verification of this would be the groundswell of voter support that carried Enrique to victory in the annual Screwball Award voting as well as the large enrollment carryover to G417 (Optics) which will have its largest enrollment in many years, approaching 20 for this fall (1993).

In February 1993, Enrique made his yearly visit to Marseille to press on with joint research on weathering with Daniel Nahon and a few other members of his lab (one of whom, J-P. Ambrosi, may come to I.U. for a year). On his visit to Salamanca in June 1992, he gave lectures on weathering and self-organization at the Spanish Geological Congress. Last fall, at the Cincinnati GSA meeting, Enrique met Richard Murray of Boston University and they now have a collaborative proposal to NSF on the genesis of the rhythmicity and banding of bedded cherts and Precambrian banded iron formations. One aim of the proposal is to enable **Yifeng Wang** to remain at I.U. for a few more years after he defends his Ph.D. thesis in the fall of 1993. Enrique's and Yifeng's joint work has produced a half-dozen papers in the past year.

**Haydn Murray** was appointed a Trustee of the Geological Society of America Foundation at the Cincinnati GSA meeting in October 1992. Haydn has been involved in GSA activities for more than 40 years, is a Fellow of the Society, and served on the GSA Council from 1982-1984.

Haydn was recently elected President of the Association Internationale Pour L'etude Des Argizes (AIPEA) at their Tenth International Clay Conference held in Adelaide, Australia, on July 16-18, 1993. The general theme of the Conference was "Clays Control the Environment" and Professor Murray gave a keynote address entitled "Clays in Industry and Environment." Over 400 clay scientists from around the world attended the conference. This award recognizes Haydn's international reputation and expertise in the Clay industry and is the first time an applied scientist has been elected President.

Haydn notes that four of his former graduate students are now working in research and development with kaolin companies in Georgia. **Tom Dombrowski** (M.A., '82; Ph.D., '92) is with Engelhard Minerals and Chemicals in McIntyre. **Jessica Elzea** (M.S., '87;

Ph.D., '90) is with Thiele Kaolin Company in Sandersville, and **Bob Pruett** (M.S., '88) and **Juan Yuan** (M.S., '90) are with English China Clay America in Sandersville. Two former students are with Oil-Dri Corporation of America, **Dave Burke** (B.S., '75; M.S., '85) is at Ochlocknee, Georgia and **Bill Moll** (M.A., '58) is Vice-President of Research and Development at their labs in Vernon Hills, a suburb of Chicago. **Franz Reisch** (M.S., '91) is a geologist for Spinks Clay Company in Paris, Tennessee and **Tim Salter** (B.S., '78; Ph.D., '88) is working in the R & D Labs at Chemical Lime Company in Ft. Worth, Texas.

Last summer (1992), Haydn went to Alaska in July for a week of salmon and rainbow trout fishing. The fishing was "fantastic". He caught a 44-pound king salmon and a 30-inch rainbow which were the two biggest caught in his party. He also saw many Alaskan brown bears, eagles, moose, caribou, and foxes. It was such a great experience that he is going back in mid-August this year.

Son Steve and his family live in Pinehurst, Texas where he works in Houston heading up offshore Gulf exploration activities for Pennzoil. Steve's daughter, Samantha, graduates from high school this year and will attend Boston College next fall. His son, Mark, will be a junior in high school next fall. Daughter Marilyn and her family (three boys) are moving to Indianapolis from Neenah, Wisconsin this summer, so the Murrays will be glad to have them closer. Lisa and her family (1 son) live in Springfield, Illinois where she is a nurse.

**Vishnu Ranganathan** is completing his fifth year at IU. In addition to co-teaching the introductory hydrogeology course with **Noel Krothe**, he's been teaching a graduate class on (1) groundwater flow and transport in sedimentary basins and (2) numerical methods in alternate years. His NSF project on groundwater flow around salt domes is in its second year and **Mark Williams**, who recently completed his M.S. with Vishnu on this project is now enjoying his new job at Battelle's Environmental Sciences Lab in Richland Washington. Recently, Vishnu has been working on the flushing out of brines from the Illinois basin and on rates of dissolved salt removal. He's been striving to include more and more computer exercises in his classes and new developments in software are making that more easy. Starting in the Fall of 1994, he will also teach an introductory oceanography class.

Last summer (1992), Vishnu married Peg Flynn. Peg is working on her dissertation in French literature at IU. They traveled a bit in Michigan after the wedding and spent three weeks in India in December. The timing of this

trip unfortunately was bad and they experienced being in a riot-torn city (Bombay) for the first time. Peg survived that, as well as a nasty stomach upset and can't wait to go back! This summer, Vishnu and Peg hope to do something more peaceful and less thrilling, perhaps some camping and hiking in the West.

**Ed Ripley** had two visiting professors in his lab this past year. **Raul Lira** of the University of Cordoba, Argentina, returned from October-February to study oxygen and hydrogen isotopes of quartz-muscovite greisens in the Achala batholith. **Sang Ho Moon**, Seoul National University, Korea, visited for a year beginning in July 1992 to use Ed's lab for isotopic studies of tin and base metal mineralization in Korea. In addition to renewal of his NSF grant for study of the Duluth Complex and two other grants, Ed was awarded a Midcareer and Senior Faculty Fellowship from IU for experimental studies of copper solubility in mafic magmas.

Last summer, Ed worked for Chemical Lime Company in search of high-calcium limestone (much to be used as a scrubber for smelters in the Arizona - New Mexico copper country). Exploration work began in the desert of southwest New Mexico and southeast Arizona, Utah, and Nevada. Although he found them to be unlikely quarry sites, work around Grand Canyon and Bryce Canyon National Parks was scenic. Much was learned about heap leach gold operations, particularly in Nevada. Ed's field partner was graduate student **Tim Johnson**. Never a dull moment was had as Tim handled their vehicle in 4-wheel drive terrain.

Ed enjoys gardening, soccer coaching, and tennis. Alumni will be pleased to know that he remains an avid basketballer at noontime. He says he misses the likes of **Pete "Stretch" Dahl**, **Greg "Hot Rod" Mack**, **Bill "Couz" Ausich**, and **"Jumpin" John Waldrip**, **"Pistol" Pete DeCelles**, and **"Jammin" Joe Dixon**, **Ron "The Gun" Jorgenson**, and **Denny "Postman" McGrath**. Still, the game goes on! **Andy Campbell** renewed his HPER court-time during a recent visit to the Department. Ed thinks that Andy would agree that I.U. basketball still beats that in New Mexico. Greg may think otherwise!

Wife Kathleen is very active at St. Charles School and Eric, 16, is a sophomore at Bloomington South and a member of the under 16-1/2 Indiana State Olympic Development team. Jonathan, 13, is a seventh grader at St. Charles, a member of school choir, and a violinist. He's a member of the under 13-1/2 Indiana Development team so soccer definitely still is a big activity in the Ripley

family!

**Al Rudman** will be on sabbatical during the fall semester 1993. During June he will be traveling in Korea and China. He's been invited to present lectures (in English) at several universities in both countries. In July and August, Al will be working in Hawaii on synthetic seismogram studies with **Professor Neil Frazer**. The fall semester will be spent working at CIRES (Boulder, Colorado) on temporal velocity variations in central Asia.

**Bob Shaver** continues to be busy in "retirement." We all know how great Bob is with the prose, so this editor will give you excerpts in his own words (not the whole thing - we couldn't afford to publish it).

I am in my second year as an associate editor for the GSA Bulletin and am surprised that the elected editors haven't fired me. They think I am an expert of sorts on carbonate rocks, and they keep sending me manuscripts ranging from Archaean stromatolites to late Quaternary sedimentation in the Bahamas. I hadn't realized I was so good at fooling people, and so now I am thinking of beginning a new career as a politician.

Within one or two months I will submit for review and possible publication a book-size manuscript on the geology of Indiana as requested by the Indiana Geological Survey: The Indiana Geologic Terrane -- A Story Told by Rocks. Its idea is rather comprehensive but for lay consumption, and it has coffee-table aspects if my recommendation for some 80 illustrations is realized. Maybe too expensive to publish.

My wife, Sue, and I went on another rather adventuresome vacation last summer, August 1992, with an Indiana Alumni Association tour group to central Siberia (as far as Irkutsk and Lake Baikal) and ended with a flight back to Alaska....that volcano west of Anchorage erupted, and while we were in the air we did not know where we could land but were rerouted to Fairbanks before we ran out of fuel! Bussed then to Anchorage and there enjoyed a day in the ash cloud! This vacation did have aspects of a geologic field trip for me as I boned up on the geology of both Siberia and coastal Alaska, knowing that I, as a geologist, would be asked questions about some most fascinating geologic subjects that we would see. When asked to introduce myself, I told the group I would answer free of cost geologic questions for everyone except the doctors and lawyers in our group - my fee for them would be \$100 an hour. As you know, I am a ham but unshelchable writer, and I produced a large nicely printed and illustrated (123

mostly colored illustrations) account of this adventuresome vacation: We Dared the Trans-Siberian Express, Aeroflot, and Love Boat and Yet Survived to Tell these Tales.

I have continued my genealogical research and published a new family genealogy, March 1993, about 300 p., including 90 plus illustrations: From Great Britain to Western Illinois, A Glass - Cone - Smith Sequel. Among my more "illustrious" ancestors, I find that I have great...great grandfathers like these: (a) an English traitor who deserted King George III's army and fought for the Americans during the Revolution; (b) a New Yorker who fought for the Americans in a Canadian regiment during the same war but was dishonorably discharged; (c) a Scot who fought against Oliver Cromwell, lost and was shipped to New England as a slave-prisoner and sold for twenty pounds; and (d) Massachusetts sailors and fishermen of the 1600s who were in trouble with the law and the Puritan church societies (same thing).

Last summer, my house and garden was one of five or six places chosen for tour by the Bloomington Garden Club (or whatever their name is). I'm sure my garden was chosen as the token small city lot, but the favorable weather and my effort resulted in a good show.

**Lee Suttner** somehow manages to still go full-bore with his research even while serving as Chairman of the Department and Director of the Geologic Field Station. He has two graduate students, **Nathan Way** and **Pat O'Malley**, mapping Early Cretaceous alluvial systems in the area of the Black Hills in Wyoming and South Dakota. Outcrop data are being integrated with regional subsurface data from the Powder River Basin through the skillful guidance of **Lloyd Furer** of the Indiana Geological Survey. The work is in its fifth year of support from NSF and is designed to evaluate the relative influence of basin-margin, intrabasin, and cratonic tectonic controls on the location, morphology, and gradients of the alluvial systems. A major paper summarizing the initial results of an analogous study in the Wind River Basin of Wyoming appears in the March 1993 issue of Basin Research and a second paper is in review for inclusion in a SEPM special publication.

**Michael May**, who has been a major contributor to the foreland basin project, completed his Ph.D. degree requirements in November and has joined Shell in Houston. He led a field trip for the Wyoming Geological Association last summer into areas of the Wind River Basin where he and several others from I.U. have been working for the past five years. His extensive knowledge

of the nonmarine Cretaceous throughout the northern Rocky Mountains and his assistance in Lee's work are already greatly missed.

**Suzanne Kairo** also finished her Ph.D. requirements in December and has joined Exxon Production Research in Houston. Suzanne examined the influence of depositional processes on sandstone composition in a river-dominated delta of Pennsylvanian age in northern Colorado. This supplemented earlier analogous work Lee had done in a wave-dominated Pennsylvanian delta near Colorado Springs. An article comparing and contrasting the results of their independent work in the two types of deltaic systems is in press in a GSA special publication. The loss of Suzanne's wonderful enthusiasm for science and broad knowledge in sedimentary geology also is being significantly felt in Lee's research group.

The Rocky Mountain Association of Geologists has selected an article Lee co-authored with former student **Andrew Malone** as the Outstanding Paper in the 1992 volume of Rocky Mountain Geologist. The article was based on Andrew's masters degree research on the Morrison Formation along the northern flanks of the Tobacco Root Mountains in Montana. Lee was an unsuccessful nominee for 1993 President-elect of the Society of Sedimentary Geology (SEPM). He extends thanks to everyone who voted for him -- for their support, as well as to everyone who didn't -- for saving him from additional administrative responsibilities.

**Dave Towell** was re-elected to a one-year term on the Bloomington Faculty Council. During 1993-1994 he will chair the BFC Student Affairs Committee and serve on the system-wide University Faculty Council as co-chair of the UFC Student Affairs Committee. During July 1993, after finishing up his 26th summer at the Geologic Field Station in Montana, Dave journeyed to the northwest Basin and Range volcanic terrain of California near the eastern flank of the Cascades. There he had the very special experience of serving for two weeks as a field assistant to his son, Brian, who is doing graduate research at the Colorado School of Mines.

Dave continues to enjoy running. After running the 1983 New Orleans Mardi Gras Marathon, he's tapered off to the Louisville Kentucky Derby Festival Mini-Marathon (13 miles) for the past ten years. Other favorite pastimes are hiking in Glacier National Park and, of course, I.U. athletics.

Lindsay has recovered from her broken hip sustained at the Advisory Board / Faculty pot-luck dinner in March. Both Lindsay and Dave are thrilled by their first grandchild, Jessica Lindsay, born to Garrett and Cheri Towell on December 21, 1992. Garrett is a senior majoring in environmental science at I.U. Cheri is a registered nurse at the Bloomington Hospital.

**Bob Wintsch** attended a December 1992 USGS-sponsored workshop on the San Andreas fault and later a Keck Research Consortium meeting held at Walla Walla, Washington where 75 undergraduate research projects were presented. Bob and his students continue to do field work in New England, now always associated with mineral age dating. His group has also started work in the Piedmont of Virgin, collaborating with the USGS, Reston.

## FACULTY RESEARCH GRANTS

- A. **BASU** (NASA) - "Petrologic evolution of lunar and meteorite parent body regolith."
- S. **BRASSELL** (PACKARD FDN) - "Molecular organic geochemical research studies of climatic variations over geological time."
- S. **BRASSELL** (NSF) - "Temporal variations in molecular records of sea surface temperatures and plankton productivity: assessment of high resolution signals in sediment trap particulates."
- S. **BRASSELL** (AM CHEM) - "Combined organic and isotopic assessment of cretaceous paleoenvironments."
- J. **BROPHY** (NSF) - "A petrologic and ion-probe study of hornblende gabbro cumulates from Medicine Lake volcano: an evolution of competing mechanisms of calc-alkaline fractional."
- J. **BROPHY** (TEXAS A&M) - "Mineralogic and experimental studies of Leg 142 igneous rocks."
- J. **BROPHY** (TEXAS A&M) - "Ocean drilling program, leg 142 (engineering test leg III)."
- J.R. **DODD** (MARATHON OIL) - "Architectural elements, composition, and diagenesis of the shoal facies of the Salem Limestone, south central Indiana."
- M. **DORAIS** (NSF) - "An ion and electron microprobe study of apatite in the Red Hill Complex, New Hampshire."
- J. **DUNNING** (NSF) - "Environmental weakening of geologic materials."



- M. HAMBURGER** (USGS) - "Seismicity and crustal structure in an active collisional orogen, Soviet Central Asia"
- M. HAMBURGER** (NSF) - "Tectonics of subduction zone terminations: a case study in northernmost Tonga".
- M. HAMBURGER** (NSF) - "Applications of global positioning system measurements to continental collision in the Pamir-Tien Shan Region, USSR. (through 1993)
- M. HAMBURGER** (NASA) - "Applications of global positioning system measurements to continental collision in the Pamir-Tien Shan Region, USSR. (through 1996)
- M. HAMBURGER** (Dept. Interior) - "Collaborative research: multidisciplinary study of geodynamics in an active collisional orogen, Soviet Central Asia."
- M. HAMBURGER** (NSF) - "Seismic monitoring of Mt. Pinatubo, Luzon, Philippines."
- M. HAMBURGER** (IRIS) - "Kirghizia Seismic Array Program." Phase I
- M. HAMBURGER** (IRIS) - "Kirghizia Seismic Array Program." Phase II
- M. HAMBURGER** (USGS) - "Multidisciplinary Study of Geodynamics in an active collisional orogen, Soviet Central Asia."
- M. HAMBURGER** (National Research Council) - Support for hosting scientists and engineers from the newly independent states of the former Soviet Union in the United States/Khalturin."
- M. HAMBURGER** (National Research Council) - Support for hosting scientists and engineers from the newly independent states of the former Soviet Union in the United States/Rautian."
- M. HAMBURGER** (NSF) - "Applications of global positioning system measurements to continental collision in the Pamir-Tien Shan Region, USSR." (through 1997)
- M. HAMBURGER** (NSF) - "Analysis of seismic data from Pinatubo Volcano, Philippines."
- J. HAYES** (UNIV.CALIF.-DAVIS) - "Midwestern Regional Center of the National Institute for Global Environment Change: studies of the biogeochemical cycle of carbon relationships between pCO<sub>2</sub> and the <sup>13</sup>C sedimentary organic matter."
- J. HAYES** (UNIV.CALIF.-DAVIS) - "Midwestern Regional Center of the National Institute for Global Environmental Change: isotopic studies of the biogeochemical cycle of carbon."
- J. HAYES** (NASA) - "Isotopic biogeochemistry."
- J. HAYES** (CHEVRON) - "Cooperative research/academia compound specific isotope analysis."
- J. HAYES** (NSF) - "A collaborative, biogeochemical study of the Jurassic Lower Oxford Clay, England."
- J. HAYES** (DOE) - "Isotopic studies of the biogeochemical cycle of carbon relationships between pCO<sub>2</sub> and the abundance of <sup>13</sup>C in sedimentary organic matter."
- J. HAYES** (DOE) - "Isotopic studies of the biogeochemical cycle of carbon relationships between pCO<sub>2</sub> and the abundance of <sup>13</sup>C in sedimentary organic matter." Merit Enhancement of Project.
- J. HAYES** (NSF) - "Isotopic analyses of DOC and cell concentrates."
- J. HAYES** (NSF) - "carbon-isotopic records of Quaternary CO<sub>2</sub> levels."
- J. HAYES** (NSF) - "Maintenance of preindustrial atmospheric pCO<sub>2</sub> levels: recalibration of a carbon isotopic paleobaromete and pCO<sub>2</sub> mapping of the late Quaternary global ocean."
- N. KROTHER** (WESTINGHOUSE) - "Spectrofluorophotometer analysis of fluorescent dyes injected into groundwater wells in local landfills."
- LANE, G.** (NSF) - "Paleobiogeography of Late Devonian and Carboniferous echinoderms from the Peoples Republic of China."
- E. MERINO** (NSF) - "Self-organization in agate: textures, compositions, and dynamic crystallization modelling."
- E. MERINO** (NSF) - "Self-organization origin of fibrous texture and twisting of agate quartz: dynamic crystallization model."
- H. MURRAY** - (UNION FNDN) "Industrial minerals research."
- G. OLYPHANT** - (NOAA) University of Illinois, "Contemporary and historical eolian sand transport in a coastal dune environment, South Shore, Lake Michigan, In."
- G. OLYPHANT** (DNR) - "Research and reclamation feasibility studies at the Friar Tuck Mine site, Sullivan and Green counties, Indiana."
- G. OLYPHANT** (IDEM) - "Evaluation of dry well leachate flow in the Dunes area, Lake and Porter counties, Indiana."
- G. PAVLIS** (IRIS) - "Use of a small aperture seismic array for earth structure, seismotectonic and earthquake prediction studies in the United States with the Soviet Academy of Sciences."
- G. PAVLIS** (IRIS) - "Joint US-USSR Program: Kirghizia seismic network and small aperture seismic array studies".
- G. PAVLIS** (NSF) - "Appraisal of relative earthquake location errors."

- G. PAVLIS (USGS)** - Seismicity and crustal structure in an active collisional orogen, Soviet Central Asia."
- G. PAVLIS (USGS)** - "Multidisciplinary study of geodynamics in an active collisional orogen, Central Asia."
- L. PRATT (DOE)** - "Gas chromatograph-mass spectrometer for organic geochemical research."
- L. PRATT (NSF)** - "Cooperative study of cretaceous black shales in Benue Trough, Nigeria."
- L. PRATT (NSF)** - "Biogeochemistry of lipid biomarkers in modern and fossil bivalve shells."
- L. PRATT (Various Petroleum Grants)** - "Sedimentary organic geochemistry research."
- L. PRATT (Trintopec Local Joint Venture)** - "Cretaceous black shales of Caribbean and adjacent basins in Pacific and Atlantic realms."
- L. PRATT (INTEVEP)** - "INTEVEP, S.A. and Indiana University agreement for training."
- L. PRATT (DOE)** - "Isotopic studies of the biogeochemical cycle of carbon relationships between pCO<sub>2</sub> and the abundance of <sup>13</sup>C in sedimentary organic matter."
- L. PRATT (DOE)** - "Isotopic studies of the biogeochemical cycle of carbon relationships between pCO<sub>2</sub> and the abundance of <sup>13</sup>C in sedimentary organic matter." Merit Enhancement of Project.
- L. PRATT (MOBIL)** - "Research on isotopic geochemistry of sulfur."
- L. PRATT (NOAA)** - "Detection of algal symbiosis in fossil reef builders via stable carbon isotopic signatures: a test of the method's applicability using modern scleractinian corals."
- L. PRATT (NSF)** - "A stratigraphic and geochemical transect across northern South America for assessment of paleoceanographic events in the Caribbean gateway during the middle Cretaceous."
- V. RANGANATHAN (Various)** - "Fluid flow studies."
- V. RANGANATHAN (NSF)** - "Basin dewatering near salt domes in the U.S. Gulf Coast."
- E. RIPLEY (NSF)** - "Mechanisms of platinum-group element enrichment and the nature of the hydrothermal system at the Babbitt Deposit, Duluth Complex, Minnesota."
- E. RIPLEY (NSF)** - "Metal sources and mechanisms of enrichment for CU-NI-PGE mineralization in FE-TI-rich gabbroic rocks, Duluth Complex, Minnesota."
- E. RIPLEY (Martin-Marietta)** - "Isotope analysis of 18-oxygen/16-oxygen isotope ratios in granite rock powders."
- E. RIPLEY (Various)** - "Isotope research studies."

- M. SAVARESE (AM CHEM)** - "A paleoecological field test of the functional interpretation of archaeocyathan paleobiology using lower Cambrian reefal carbonates from South Australia."
- M. SAVARESE (NOAA)** - "Detection of algal symbiosis in fossil reef builders via stable carbon isotopic signatures: a test of the method's applicability using modern scleractinian corals."
- L.J. SUTTNER (NSF)** - "Regional chronostratigraphic and sequence stratigraphic analysis of central cordilleran foreland basin."
- R. P. WINTSCH (NSF)** - "Thermochronology and thermobarometry in lithotectonic zones in eastern New England."
- R.P.WINTSCH ET AL.(NSF)** - "Acquisition of an electron probe microanalyzer."

## DEPARTMENT OF GEOLOGICAL SCIENCES FACULTY AND STAFF

Professors: **Abhijit Basu, Simon Brassell, James Brophy, J.Robert Dodd, Jeremy Dunning, Michael Hamburger, Donald Hattin, John Hayes, Norman Hester, Noel Krothe, N. Gary Lane (Associate Chair), Enrique Merino, Haydyn Murray, Greg Olyphant, Lawrence Onesti, Gary Pavlis, Lisa Pratt, Vishnu Ranganathan, Edward Ripley, Albert Rudman, Michael Saverese, Lee Suttner (Chair), David Towell, Robert Wintsch**

Part-Time Professors: **Ned Bleuer (Survey), Donald Carr (Survey), Henk Haitjema (SPEA), Peter Ortoleva (Chemistry), Carl Rexroad (Survey), Jeff White (SPEA)**

Professors Emeritus: **Robert Blakely, John Droste, Judson Mead, Robert Shaver, Charles Vitaliano**

Research Scientists: **Haydar Al-Shukri, Michael Dorais, Bruce Douglas, Andrew Fisher, Alan Horowitz, Arndt Schimmelmann**

Research Associates: **John Jasper**

Visiting Research Associates: **Ildefonso Armenteros (Jan, '94), Jae-III Chung, Colin Harvey, Vitaly Khalturin, Ruth Moore, Tatyana Rautian, Elena Spadafora, Yutian Wang**

Post Docs: **Emily CoBabe, Julie Kennedy**

Librarian: **Lois Heiser**

Staff:

**Sarah Burton**, Administrative Assistant,  
Chair's Office  
**Patty Byrum**, Administrative Secretary,  
Chair's Office  
**Lorie Canada**, Faculty Secretary, Fifth Floor  
**Ruth Droppo**, Research Secretary, Third Floor  
**Jon Fong**, Technician, Biogeochemical Labs  
**Mark Gilstrap**, Chemist, Analytical Chem Labs  
**Gary Hinton**, Resident Manager, Field Station  
**Mary Iverson**, Student Records, First Floor  
**Charles Miller**, Machinist  
**Julie Primack**, Technician, Biogeochemical Labs  
**Debbie Pryor**, Senior Secretary, Business Office  
**Jean Reese**, Research Secretary, Third Floor  
**Kim Schulte**, Administrative Secretary,  
Geologic Field Station Program  
**Brian Snow**, Computer Systems Manager  
**Kimberly Sowder**, Drafting Technician  
**Terry Stigall**, Electronics Technician  
**Steven Studley**, Mass Spec. Manager  
**James Tolen**, Draftsman, Cartographic Services  
**Rodney Ward**, Faculty Secretary, Fourth Floor

## STUDENT AWARDS AND GRANTS

### Undergraduate

Senior Faculty Award-  
**Rebecca Robinson**, Alexandria, VA  
Junior Scholarship Award-  
**Dana Strength**, Valparaiso, IN  
N. Gary Lane Award (Beginning Major)-  
**Priya Ganguli**, Terre Haute, IN  
Minority Achiever's Program Scholarship-  
**Amanda Hopkins**, Valparaiso, IN  
Junior Professional Development Awards (Society  
membership and journal)-  
**Jennifer Becker**, Bloomington, IN  
**Claire Elkington**, West Chicago, IL  
**Jason McCuistion**, Springfield, OH  
College of Arts and Sciences Alumni Award-  
**Penny Alano**, Providence, KY  
Phi Beta Kappa-  
**Rebecca Robinson**, Alexandria, VA  
IU Nominee for Barry Goldwater Scholarship-  
**Dana Strength**, Valparaiso, IN

Honors Division Undergraduate Research Awards-  
**Chris Dintaman**, Bloomington, IN  
**Andrea Wright**, Bloomington, IN  
USGS Travel Grant-  
**Jennifer Becker**, Bloomington, IN  
Keck Foundation Research Fellowship and Travel Grant-  
**Amanda Hopkins**, Valparaiso, IN

### Field Station Scholarships (IU Students)

Charles Deiss Field Station Scholarship-  
**Rebecca Robinson**, Alexandria, VA  
Field Station Scholarships-  
**Lou Bucklin**, Spencer, IN  
**Frances Cooper**, Cincinnati, OH  
**Kathleen Dull**, Huntington, IN  
**Stephanie Ingle**, Indianapolis, IN  
**Jennifer Klug**, Richland, MI  
**Dana Strength**, Valparaiso, IN  
**Robert Reuss**, Unionville, IN  
**Jennifer Becker**, Bloomington, IN  
**Jason McCuistion**, Springfield, OH

### Graduate

Estwing Award-  
**Susan McDonald**, Freedom, IN  
Department of Geological Sciences Honors-  
**John Hohman**, Brookport, IL  
Outstanding Associate Instructor (Beginning level)-  
**Glenn Bear**, Fostoria, OH  
Outstanding Associate Instructor (Upper level)-  
**Dorothy Payne**, Berkeley, CA  
Cumings Award-  
**Clay Harris**, Evansville, IN  
Chevron Oil Company Fellowship in Geophysics-  
**Lorie Bear**, Creve Coeur, MO  
Shell Oil Company Fellowship-  
**Neill Vaughan**, Crestview, FL  
Grassmann Fellowship-  
**Clifford Ambers**, Polk, OH  
Geochemistry Fellowship-  
**Ruiliang Wang**, Beijing, China  
Elvis J. Starr Fellowship-  
**Qiangsheng Huang**  
John B. Patton Award-  
**Huitang Zhou**, Shanxi, China  
Brazilian Government Fellowship-  
**Ana Maria Carmo**, Salvador, Bahia, Brazil

AAPG Grant in Aid of Research-  
**Susan McDonald**, Freedom, IN  
 National Science Foundation Grant-  
**Emmanuel Ramos**, Quezon City, Philippines  
 Clay Minerals Society Grant-  
**Clifford Ambers**, Polk, OH  
 GSA Travel Grant-  
**InSung Lee**, Seoul, Korea  
 Paleontological Society Grant-  
**Karl Leonard**, Palouse, WA  
 GSA Research Grant-  
**Brad Hellickson**, Willmar, MN

Paleontological Society Grant and Lerner Gray Fund for  
 Marine Research (American Museum of Natural History)-  
**Barbara Grehl**, Nanuet, NY  
 Sigma Xi Initiates-  
**Lou Bucklin**, Spencer, IN  
**Chris Gellasch**, Sterling, Heights, MI  
**Brad Hellickson**, Willmar, MN  
**Jane Hultberg**, Ontario, NY  
**Mohammad Iqbal**, Dhaka, Bangladesh  
**Jennifer Lewis**, Landisville, PA  
**Susan McDonald**, Freedom, IN  
**Rob Mellors**, North Royalton, OH  
**Nathan Way**, Bloomington, IN



The 29<sup>th</sup> Annual Clay Minerals Society Meeting in Minneapolis, MN on November 3, 1992 (kneeling L to R):  
 Andy Thomas, Colin Harvey, Wayne & Lorraine Bundy;  
 (standing): Tim Salter, Bob Pruett, Peter Braendlein, Tom Toth, Haydn & Juanita Murray, Bill Moll, Jessica Elzea, Tom Dombrowski and Silvana Bertolino.

## DEGREES AWARDED

### M.S.

**Autio, Robert** - Stratigraphy and Geomorphology of the Sediments of Glacial Lakes Quincy, Eminence, and Alaska, West-Central Indiana. (3/92)

**Basch, Mark E.** - Variations in Sulfur Isotope Composition and Water Chemistry Near the Crooked Creek - Fowler Fault, Oklahoma Panhandle and Southwest Kansas. (5/93)

**Bear, Glenn W.** - Linear Least Squares Inversion: Determination of 3-D Density Structure from Gravity Data. (11/92)

**Clements, Edward J.** - Mineralogy and Industrial Applications of the New Providence Formation of the Borden Group in Morgan County, Indiana. (8/92)

**Ferguson, Victoria R.** - Hydrogeology and Hydrogeochemistry of Fine-grained Glacial Till, Northeast Indiana. (11/92)

**Hultberg, Jane** - The Rheology of the Mantle Lithosphere Beneath Southern South America and the Influence of a Subducting Spreading Center. (2/93)

**Ramos, Emmanuel** - Seismic Expression of Faults within and around the Peter the First Range, Tadjikistan. (6/92)

**Reisch, Franz J.** - Investigation of the Geology, Mineralogy and Economic Utilization of the Porters Creek Formation in Tippah County, Mississippi. (12/91)

**Smith, Laurence C.** - Time-Trends of Sediment Yield during Storms: Friar Tuck Abandoned Mining Site, Southwestern Indiana. (12/91)

**Stewart, Michael** - Petrogenesis of High Alumina Flood Basalts, Steens Mountains, Oregon, (6/92)

**Wendorf, Scott F.** - Speciation and Isotopic Fractionation of Sulfur in Sediments of the Santa Monica Basin, Offshore California. (8/92)

**Williams, Mark** - Two- and Three-Dimensional Numerical Simulations of Continuous and Episodic Basin Dewatering Around a Salt Dome with the Formation of Thermal and Brine Plumes. (5/93)

### Ph.D.

**Anderson, Paul** - Animated Visualization Techniques for Three-Component Seismic Array Data. (5/93)

**Collister, James W.** - An Isotopic Biogeochemical Study of the Green River Oil Shale (Piceance Creek Basin, Colorado). (5/92)

**Dombrowski, Thomas** - The Use of Trace Elements to Determine Provenance Relations Among Different Types of Georgia Kaolins. (5/92)

**Ebraheem, Abdel-Azim M.** - An Optimization Procedure for Calculating Unsaturated Groundwater Flow Model Parameters from Observed Changes in Soil Moisture Profiles with an Example from a Deposit of Coal Miner Refuse. (3/93)

**Ghose, Shankar N.** - Mineability Potential of the Illinois Basin Coal Reserves: An Economic Evaluation of the Geologic Variables. (12/92)

**Harris, Clayton D.** - Depositional Environments of a Chesterian-Age Carbonate-Siliciclastic Couplet: Beech Creek Limestone and Big Clifty Formation, Illinois Basin. (8/92)

**Hieshima, Glenn B.** - Organic and Isotopic Geochemical Study of the Middle Proterozoic Nonesuch Formation, North American Midcontinent Rift. (5/92)

**Holbrook, John M.** - Developmental and Sequence-Stratigraphic Analysis of Lower Cretaceous Sedimentary Systems in the Southern Part of the United States Western Interior: Interrelationships between Eustasy, Local Tectonics, and Depositional Environments. (9/92)

**Huang, Qiangsheng C.** - The Paleocological and Stratigraphic Implications of Dispersed Cuticles from the Mid-Cretaceous Dakota Formation of Kansas and Nebraska. (5/93)

**Kairo, Suzanne** - Facies-Related Mineralogic and Geochemical Variations in Sandstones from the Minturn Formation (Pennsylvania), North-Central Colorado. (12/92)

**May, Michael** - A Regional Tectono-Stratigraphic Analysis of the Late Jurassic-Early Cretaceous Cordilleran Foreland Basin, Wind River Basin Region, Wyoming. (12/92)

**Pruett, Robert J.** - A Mineralogic and Geochemical Comparison between Several Primary and Sedimentary Kaolins of North America. (3/93)

**Webster, John R.** - Petrology of Quaternary Volcanics of the Broken Top and Diamond Peak Areas, Central and South-Central Oregon High Cascades: Evidence for Varied Magmatic Processes from Two Contrasting Volcanic Centers. (12/92)

**Zaback, Doreen A.** - Geochemical and Stable Isotopic Study of the C-S-Fe-Mn-P System in the Miocene Monterey Formation, Santa Maria Basin, California. (5/92)

## STAFF PROFILES

Continuing a new feature introduced in last year's Newsletter, we are profiling additional members of our support staff. Their combined efforts are extremely important in the accomplishments of the Department and the Geologic Field Station.

**Debbie Pryor** joined the staff of the Department on March 1, 1993 as the senior secretary/receptionist in the Department's Business Office (room 129). Debbie is a native Hoosier who grew up in nearby Owen County and eight years ago moved to Monroe County. She and her husband of ten years, Tommy, recently bought a new house about five miles west of Ellettsville on Ratliff Road. Debbie enjoys spending her spare time getting her new house in order. She also enjoys quilting, sewing for weddings, shopping for bargains, and attending auctions. She worked at Indiana University previously as a receptionist and secretary in the Medical Sciences Program in Myers Hall, has been a customer service representative and worked as a Mary Kay Beauty Consultant. She and Tommy have a seven-year-old son, Joseph Wren; her family also includes her husband's two married daughters, one of whom has a new baby daughter which gives Debbie the opportunity to be the doting grandmother along with all her other interests and activities. Debbie has lots of energy (an essential for the frenetic pace in the front office!!) and has been busy reorganizing a lot of the business office area since she arrived.

### At the Geologic Field Station The Hinton Family

**Gary Hinton** is Resident Manager of the Geologic Field Station in Cardwell, Montana. Continuing a long

family tradition, **Gary** took over managing the day-to-day operations in April, 1987, when his father **Gene Hinton** retired as manager after serving since 1967. Gary's grandparents, **Herbert and Aletha Dutton** were the first resident managers of the Field Station from the time it was established in 1949 until Mr. Dutton's death in 1967. **Gene** and his wife **Lois** stepped in to assume the management operations.

**Gary** was born in Ennis, Montana in 1955 and recalls spending each summer at the IUGFS visiting his grandparents. Later when his father, **Gene**, became Manager, the family lived on the Field Station grounds and **Gary** worked there each summer. It felt very natural to step into the role of resident manager in 1987. Prior to his position at the Field Station, **Gary** worked in a variety of jobs which included positions with the Milwaukee Railroad, and as a machine operator and a mill operator at the Golden Sunlight gold mine near Whitehall. His hobbies and interests include big game hunting, fishing, horseback riding, backpacking, mountain climbing, downhill and cross-country skiing, photography and IU Basketball. He especially enjoys watching his two children **Dusty** and **Hope** play basketball at Harrison High.

**Mary Sue Hinton**, **Gary's** wife provides assistance at the Station in countless ways. For the past nine years she has been the head cook and says she enjoys cooking for the field camp and likes the interesting summers when so many college students are living in such close quarters. During the rest of the year, **Mary Sue** works as a cosmetologist.

**Mary Sue** and **Gary** were married in the Main Lodge at the Field Station in 1973. They have two children, **Hope**, 17, and **Dusty**, 15. **Mary Sue** enjoys horseback riding, downhill and cross country skiing and during the snowbound parts of winter spends time crocheting. She, like **Gary**, really enjoys watching her two children in their sports activities -- **Dusty** in cross-country and basketball, and **Hope** in basketball.

**Hope** and **Dusty Hinton** also participate in helping with the numerous tasks involved in operating and maintaining such a large facility. **Hope** has been an assistant cook for the past few years, working in the kitchen during the summer along with the cooking staff. **Dusty** has already learned a lot about the Field Station by providing very able assistance to his dad during the summer months. They both attend Harrison High, where they actively participate in a variety of sports. **Hope** was

named second-team all-conference in basketball this past season and also is a manager for boys basketball at Harrison High. Like other family members she likes watching IU basketball. She enjoys school, participates in several other school activities, and enjoys spending time with her friends. **Dusty** also enjoys watching IU basketball and the Detroit Pistons. He enjoys big game hunting, downhill skiing, and Nintendo.

**Gene Hinton** assumed the duties of resident manager and **Lois Hinton** became assistant resident manager of the Field Station when her father, **Herbert Dutton** passed away in 1967. They moved their family to the Field Station and continued in their positions until **Gene's** retirement in April, 1986.

**Gene** was born in Ennis, Montana. He grew up in the area and attended the local schools in Ennis, Cardwell and Harrison. He also attended Western Montana College in Dillon then later joined the Army Air Corps. He and **Lois** were married in 1948. Before becoming the Field Station manager, **Gene** worked as a shipping supervisor at the Ideal Cement Company. He enjoys hunting, raising apples, following the various interests of his grandchildren, and especially is interested in Bobby Knight and the I.U. Hoosiers. **Gene** was a basketball referee in the region for many years.

**Lois Hinton** was born in Big Timber, Montana and attended the local schools in Big Timber, Cardwell, and Whitehall where she graduated from high school in 1945. She and **Gene** have a daughter, Sharon Jean Hagemo, in addition to their son, Gary. They also have a total of seven grandchildren. **Lois** likes crafts and enjoys an active interest in her grandchildren.

**Lois** worked as a Western Union teletype operator, a PBX operator, and then for more than twenty years as an administrator with the Farmer's Home Administration of the U.S. Department of Agriculture. She retired from the USDA in May, 1989 but remains active with her house-sitting business.

## ADVISORY BOARD

The Advisory Board met in Bloomington on March 5-6, 1993. The two-day session included the Chairman's report on Department activities, meetings and reports by standing committees, a meeting with the Student Advisory Committee, and a meeting of the Board to discuss general

business and conduct elections. **Susan Green**, Director of Development, College of Arts and Sciences, analyzed activities during the past year relative to the fund-raising goals developed at last year's meeting. Dr. Jeff Alberts, Associate Dean of Research and the University Graduate School, discussed the structure of RUGS and its primary role as an advocate for research at Indiana University.

Faculty met informally with the Board during the Friday morning session, and the popular pot-luck dinner with Board members and faculty with their spouses and friends was held on Friday evening at the University Inn. Attending the Board meetings this year were **Bob Boyer** (President), **Mike Graham**, **George Nevers**, **Tom Straw**, **Frank Pruett**, **Jud Mead**, **Ann Petricca**, **Bob Blakely**, **Wayne Bundy**, **Steve Young**, **Stan Anderson**, **Dick Gibson**, **Chris Smith**, **Dan Tudor**, **Marcia Engle**, and **Mal Boyce**. Members unable to attend were **Dick McCammon**, **Stephan Graham**, **Carl Smith**, **Kim Thomas**, and **Don Six**.

Satisfaction was indicated with the present committee structure and overall membership in the Board was adjusted upward to 25. **Mike Graham** was elected president and **George Nevers** was chosen as vice-president. The Educational Planning Committee will be chaired by **Tom Straw** with other member including **Frank Pruett**, **Steve Young**, **Jud Mead**, **Steve Graham**, and **Chris Smith**. The Development Committee consists of **Marcia Engle** (Chair), **Dan Tudor**, **Dick Gibson**, **George Nevers**, **Don Six**, and **Stan Anderson**. **Malcolm Boyce** will chair the Industrial Liaison Committee with other members to include **Mike Graham**, **Kim Thomas**, **Ann Petricca**, **Wayne Bundy**, and **Bob Blakely**.

To provide a perspective on employment opportunities for our graduates, we are presenting a contribution from one of our most successful and respected alumni, **Richard Gibson**. **Dick** summarizes his current view of the oil and gas industry. Our next newsletter will feature a similar overview of opportunities in the environmental sector to be authored by another respected graduate of the Department.

*This year we are including personal profiles on a number of the members of the Advisory Board. Next year we will plan to include others.*

### **Robert F. Blakely:**

Bob received his A.B in Physics from Miami University, Oxford, Ohio in 1946, his M.A. (Physics) from Miami in 1948 and his Ph.D. in Geophysics from I.U. in 1974.

Since retiring from the Indiana Geological Survey and from his part-time faculty position in the Department, he has kept busy. He's active at the YMCA and serves as a volunteer driver for the local chapter of the Red Cross. He spends additional time with traveling, photography, and computer programming. Bob and his wife, Rosanna, recently celebrated their 50th wedding anniversary and enjoy time with their two children, three grandchildren, and one great grandchild.

**Wayne M. Bundy:**

Wayne received his A.B. from the Department in 1950, his M.A. in 1954, and his Ph.D. in 1957. He worked many years in technology management, surface chemistry, rheology, light scattering of particulate minerals, functionality of kaolin in applications, and in the promotion of creativity for Georgia Kaolin Company, retiring as Vice-President of Technology. Wayne continues to maintain an interest in the nature and implementation of discovery and creativity in science and technology, science history, and epistemology. Wayne and his wife, Lorraine, enjoy spending time with their three children and one grandchild.

**Richard Gibson:**

Dick received his B.A. degree in 1971 and has three years of graduate work at Indiana University and University of California-Davis. He was appointed a member of the Department's Alumni Council in 1978. Dick has owned his own consulting firm, Gibson Consulting, since 1989. The breadth of his Indiana University education has permitted him to work on such diverse jobs as a mineral analyst of kidney stones and as an interpreter of magnetic data from the former Soviet Union for hydrocarbon exploration. Dick was a co-founder of the Tobacco Root Geological Society and its first president in 1974 and is the Editor/Publisher of Life After Gulf a newsletter for ex-Gulf Oil people. The Society recently held a meeting on the Geologic Field Station campus. Dick also enjoys serving as a volunteer instructor for G429 at the Geologic Field Station. He feels the integrative, confidence-building of the field course in Montana are invaluable to him in his daily work as a consultant.

**Michael Graham:**

Mike received his A.M. in 1978 and Ph.D. in 1983 from Indiana University. He is the newly elected President of our Advisory Board. He is currently the Director of the Earth and Environmental Sciences Center at Battelle Pacific Northwest Laboratory in Richland, Washington. In addition he serves as the Chair of the Advisory Board to Nevada Test Site on Subsurface Contamination, is an adjunct professor at Washington State University, and a member of

AGU and AAAS. He and his wife Katie have one son, Jimmy who is 15 years old. He enjoys golf, racquetball, jogging and fishing while finding time to serve his community in the local United Way activities.

This past year Mike was honored with an invitation to become a member of the Advisory Board to the Dean of the College of Arts and Sciences at Indiana University. As a member of this Board, Mike will provide a critical perspective to the direction of higher education by providing counsel on long-range planning, program development, private-sector funding, and the educational needs of corporate America.

**Marcia Engle:**

Marcia received her A.B. in Biology from I.U. in 1971 and her A.M. in Geology from the Department in 1975. She presently chairs the Development Committee of the Advisory Board. She is a past vice-president of the Tobacco Root Geological Society and a current member of AAPG, GSA, and the Houston Geological Society. Marcia and her husband, Donald Moore, enjoy day hikes, wilderness areas, and national parks. She is an animal rights advocate (as well as caring for seven cats, a dog, and a rabbit), and serves as a delegate on the Development Committee of the Veterinary Technology Program for the North Harris-Montgomery County Community College District (Texas).

**Judson Mead:**

Jud received his B.S. in 1940 and his Ph.D. in 1949 from the Massachusetts Institute of Technology. After a long and distinguished tenure as Professor of Geophysics at I.U. and Director of the Geologic Field Station in Montana, he was awarded the Niel Minor Award for Excellence in Teaching by the National Association of Geology Teachers. Jud remains active in the Department attending seminars and participating in other functions, but still finds time to enjoy summers at the family house in the New Hampshire lake country. Jud and his wife, Jane, also enjoy spending time visiting and being visited by their three children and five grandchildren.

**George M. Nevers:**

George received his A.B. from Dartmouth College following which he obtained the A.M. in Geophysics from I.U. in 1957, working with Jud Mead. He is President, Garnet Resources Corporation and currently is Vice-President of the Advisory Board of the Department. George worked 11 years with Chevron, 3 years at King Resources, 12 years with Coastal Corporation (the last 5 years as President of the Exploration-Production



Division), and 4 years with small domestic U.S. oil companies. He has been with Garnet (a publicly-held oil exploration company limited to areas outside the U.S.) since 1986. Garnet Resources is currently active in Colombia, Turkey, Papua New Guinea, France, and Canada. George started with Chevron on a seismograph crew and moved around Texas and New Mexico some 15 or 18 times. Since then he has lived in Albuquerque, Roswell, Denver, and finally the past 19 years in Houston. George married Peg Nevers in 1953 and they enjoy their four boys and one girl (an accountant in Denver, a lawyer in Richmond, a journalist and an insurance professional in Houston, and one still in college at the University of Texas at Austin). George and Peg also enjoy their three grandchildren.

**Carl J. Smith:**

Carl received his B.A. from Columbia University following which he received the A.M. in Geology from I.U. in 1969. He has done advanced studies at West Virginia University and currently serves as Deputy Director and Assistant State Geologist with the West Virginia Geological and Economic Survey. Carl also is Adjunct Professor of Geology at West Virginia University. He has served as President of the Eastern Section of AAPG as well as President of the Energy Minerals Division of AAPG. He was Technical Program Chairman for the 1988 Eastern Section AAPG Meeting. Carl's U.S. Naval Reserve unit was recalled to active duty during Operation Desert Storm. He arrived in the Persian Gulf at the end of March 1991 and for nearly one year commanded the operations of the Military Sealift Command Southwest Asia. His responsibility was to control and manage all ships that brought U.S. equipment and ammunition home. For a substantial time he was the senior naval officer in Saudi Arabia and commanded 500 sailors and had operational control over 500 ships for which he received the Legion-of-Merit from the Navy. Back in West Virginia, Carl again enjoys gym workouts, Japanese gardening, and computer programs. He has worked with the Scouts, civic clubs and is active in church affairs, maintaining the parish computer system and being a lector and lay minister of communion. Carl and his wife, Trudy, enjoy being with their sons Carl and Christopher, the latter a geology and political science major at WVU.

**Daniel A. Tudor:**

Dan received his B.S. in 1955 and A.M. in 1957 (Geophysics) from the Department. During a long and distinguished career in the oil industry, he returned to I.U. and completed his Ph.D. in 1972. In 1971, Dan became Division Geophysicist, Pacific Northwest, of Chevron's California Western Operations unit. He moved to Houston in 1974 to serve as Manager, Chevron Geophysical. He

returned to Chevron Oil Field Research Co. (COFRC) in 1977 as Manager, Geophysics Division and became Vice-President of COFRC's Exploration Research Department in 1980. In 1981, Dan became Vice-President and Manager, Exploration Services for Chevron Geosciences. He was named president of that company in 1984 which was reorganized and renamed Chevron Exploration and Production Services in 1989. Dan is a recipient of the Department's Richard Owen Award and is an SEG Trustee Associate-Committee Member as well as member of AAPG, EAEG, and Sigma Xi. His activities include fund raising for the Society of Exploration Geophysicists. He and his wife, Janet, have one daughter Elizabeth; they enjoy the increased time now available for travel which on occasion includes fishing and I.U. basketball trips with Maynard (our retired chemical analyst) and Winnie Collier.

## EMPLOYMENT OPPORTUNITIES IN THE OIL & GAS INDUSTRY

**Richard I. Gibson**  
Consulting Geoscientist  
Golden, Colorado

*"Exploration is dying.... The present condition of geologic employment is the result of success of an effort. The case is won; the job is done and the profession must turn elsewhere. It is not a cycle out of phase. There will never again be swarms of employment interviews and a seller's market in exploration.... Exploration no longer needs the numbers of geologists trained for the work of a decade ago. All of us should have realized that we permitted our profession to become too dependent on one industry."*

This quote is from John A. Wolfe, and it was written in October 1960. Mr. Wolfe could not foresee changes in politics in the Middle East and in energy usage in the United States, or other developments that increased the price of oil more than ten-fold over the early 1960s.

Recent "downsizing," restructuring, layoffs, and change in emphasis by the U.S. oil and gas industry have created a perception that the industry is dead or dying. This is not true. Abundant opportunities exist for today's graduates if they can position themselves to be competitive in a tight job market.

There is less work being done in traditional, upstream exploration in the United States than in the past, but most major companies continue to have significant exploration

efforts overseas. As always, economics and politics exert controlling influences on the oil business, and they are as unpredictable now as they were in the late 1800s, when price ranges from 10 dollars to 10 cents per 42-gallon barrel occurred. If the former Soviet Union stabilizes, it may become a windfall for oil companies and for exploration, production, and development geoscientists. Southeast Asia and Latin America are other broad regions where exploration is active today. Even in traditional, mature basins, secondary and tertiary recovery will provide opportunities for reservoir geologists and geological engineers.

In the United States, the most significant frontier for exploration (at least from the point of view of the major oil companies) is probably the deep-water Gulf of Mexico. World Oil recently (February 1993) forecast a "moderate" increase in U.S. exploration as measured by drilling -- an increase in wells to 4,781 in 1993, up 163 from 1992. Of that number, nearly half are predicted to be drilled in the Gulf of Mexico. New technologies such as 3-D seismic work are important tools there (and elsewhere), and geologists who have some knowledge of geophysics will be better placed to accomplish related studies. If economic and environmental hurdles can be overcome, Alaska and offshore California offer potential for exploration; and in the U.S., as overseas, enhanced production and development of existing fields will require geoscientists to perform geological and economic models of reservoir rocks, fluid migration, fractures, and other properties of fields.

Change in emphasis by the majors (to overseas and high-risk, high-potential plays in the U.S.) leaves a gap that U.S. independent oil companies appear to be filling. Small companies are stimulated by the relatively high price of natural gas and are exploring places like New York and Kentucky. A new sedimentary basin, pre-Late Cambrian in age, has been defined in western Ohio, and its exploration potential is only now being evaluated. Horizontal drilling in the Rockies provides a new tool for exploration and development. Associations of geoscientists are putting together plays and prospects in traditional basins in the United States, work that was formerly done in-house by big companies; the President of Pennzoil referred to the present as the dawn of "the golden age of consulting." Even though the level of activity in onshore U.S. basins is nothing like what it was 12 years ago, fascinating geological concepts are being applied to both exploration and production. Compared to 1980, when the majors snapped up dozens of graduates each year, it will be more difficult for graduating geoscientists to find employment with smaller oil companies and consulting firms, but the rewards may be

worth it. When some majors have expressed hiring levels of zero, this is an alternative that must be considered. One of the best ways to determine which companies are active, and where, is to scan the Oil and Gas Journal, the weekly trade magazine of the oil industry.

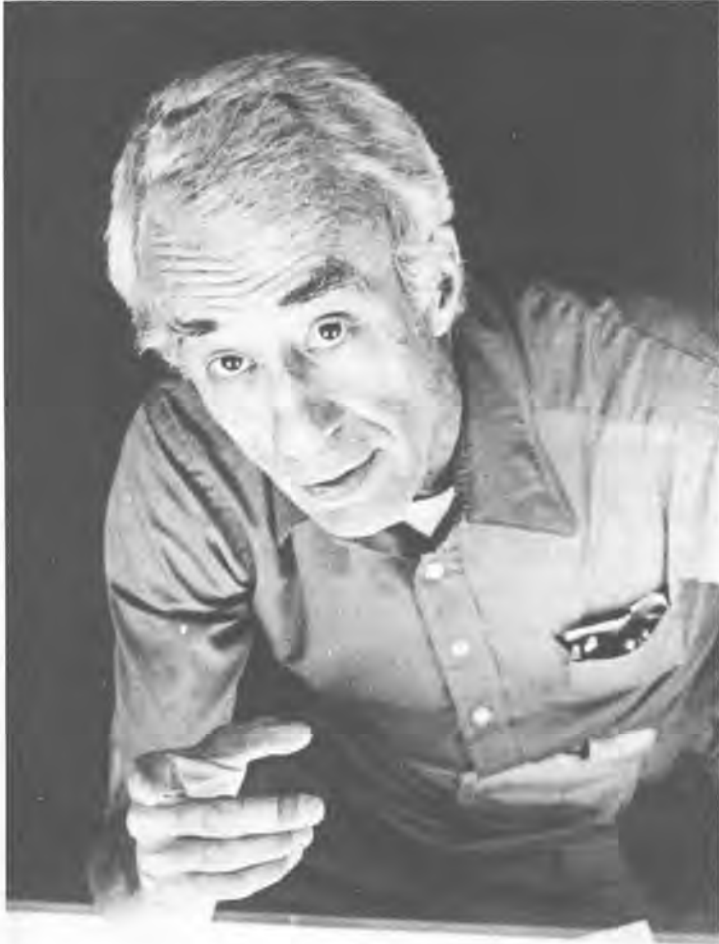
There are places in the oil industry for qualified, creative, independent thinkers. A graduate's biggest hurdle is perhaps getting the proper attention in order to get a foot in the door. The broad, traditional education provided by Indiana University is one step toward that entry, and self-enhancement is another means. Thesis topics that are geared toward oil exploration will get more attention. Computer abilities, together with effective oral and written communications skills, are virtual necessities in today's tight market; it is a fact that the best geologist in the world will probably not get or keep a job unless he or she can "sell" his or her work, whether internally to management or as a consultant to a client.

Prediction in the oil business is perilous, as the quote at the start of this article illustrates. But my opinion is that there will be geoscientists exploring for oil throughout most of our lifetimes.

## ALUMNI RECEPTIONS

The Department and the Advisory Board hosted three receptions during the past year, each in a major city where many of our alumni reside. In late September, Dan Tudor, George Nevers and Marcia Engle hosted more than 50 alumni in the Houston area. A smaller, but very enthusiastic group, gathered later in New Orleans. This event was hosted by Dan Tudor. In November, more than 30 attended a gathering in Denver which was hosted by Dick Gibson. All three receptions were highly successful and presented opportunities for alumni and friends to learn of current activities and aspirations in the Department and at the Geologic Field Station as well as to socialize and renew old acquaintances.

## OBITUARIES



**Robert V. Ruhe**

Robert V. Ruhe, retired professor of geological sciences, died February 10, 1993, age 74, at Bloomington Hospital. He had been in failing health for some years. He was born November 7, 1918, in Chicago Heights, Illinois.

Professor Ruhe graduated from Carleton College, Northfield, Minnesota, with an A.B. in geology in 1942. During the Second World War he was a naval aviator in the Marine Corps, where he advanced from Second Lieutenant to Major. After the war he entered Iowa State University, where he received a Master of Science degree in 1948. He then transferred to the University of Iowa, Iowa City, where

he received his Ph.D. degree in 1950. He was a National Research Council Post-Doctoral Fellow and Assistant Professor of Geology at Iowa State University in 1950-51 and also was a Pleistocene geologist with the Iowa Geological Survey.

From 1953 to 1970 he was a research geologist with the U.S. Soil Conservation Service, and was chief of the SCS Soil-Geomorphology Group. During this time, he was also a visiting professor at Cornell and Johns Hopkins, and a consultant for the State of Iowa, for the Organization of American States, and for the Economic Cooperation Administration in the Belgian Congo.

Robert Ruhe came to Indiana University in 1970 as Professor of Geology and Director of the Water Resources Research Center and served the University in these capacities until his retirement in 1985. He was an author or co-author on more than 80 major publications, not including abstracts or short articles. His book, *Quaternary Landscapes of Iowa*, received the outstanding book of the year award from the Iowa State University Press. Other awards include a Certificate of Merit from the Soil Conservation Service, the Kirk Bryan Award (the highest award of the Geological Society of America in the field of geomorphology), and a Centennial Citation from the Iowa Academy of Sciences. He was a member or fellow of numerous scientific societies and organizations. He served as editor or consulting editor for several journals in the fields of soils and geomorphology.

Professor Ruhe was a recognized world authority in the field of geomorphology, especially in area research on soils and landscape evolution. He trained numerous graduate students at Indiana University both at the master's and doctoral levels. He taught the senior-level geomorphology course in the Department of Geological Sciences for many years, up until his retirement. As part of his professional service to the local area, he conducted research on sedimentation in Lake Monroe and on the Monroe County landfill.

Professor Ruhe was very well-known both among his students and among his faculty colleagues for his very forthright and strong opinions on a wide variety of subjects. A news release from the IU News Bureau in 1979 states that he "is a tall spare man brimming with energy. His language is spicy, his philosophy is pragmatic". The article concludes with the statement that he will work "as long as there is someone to holler at". He set very high standards for his own research and expected no less from others.

Professor Ruhe is survived by his wife Barbara, whom he married in 1943, and three children: Robin Mead of St. Louis, Missouri; Deborah Cantarero, Maundelein, Illinois; and Jonathan Mills Ruhe, of Arlington, Virginia. He is also survived by one brother, Edward W. Ruhe of Carefree, Arizona.

(This resolution was prepared by Professors N. Gary Lane, Haydn H. Murray and J. Robert Dodd, Department of Geological Sciences, Indiana University, Bloomington, Indiana.)

\* \* \* \* \*



**Robert R. Shrock**

Robert R. Shrock, an eminent geologist and professor emeritus at the Massachusetts Institute of Technology, died on June 22, 1993, at the age of 88 after a long struggle with cancer.

Dr. Shrock was born in Wawpecong, near Kokomo, Indiana, on August, 27, 1904, the son of Andrew Shrock and Stella Glassburn. He earned an A.B., M.A., and Ph.D. from Indiana University. He joined the faculty of the University of Wisconsin and subsequently moved to MIT, where he stayed from 1937 until his retirement in 1975. His research in geology was concentrated in the areas of paleontology, sedimentology, and stratigraphy. Besides his articles in research journals, Dr. Shrock was the author of several well-known books, including Index Fossils of North American (with H. Shimer), Sequence in Layered Rocks, and Principles of Invertebrate Paleontology (the latter with W. Twenhofel). In the course of his research, Dr. Shrock discovered many new species of fossils, and several other fossils have been named in his honor. During World War II, he worked on the War Production Board. From 1949 until 1965 he was Chairman of the Department of Geology and Geophysics at MIT. Besides the accomplishments in geology during this period, he started a program of instruction and research in oceanography administered jointly by the department and the Woods Hole Oceanographic Institution. A notable achievement during his chairmanship was the construction of a 20-story building for earth sciences, completed in 1965, with funds from the benefactor Cecil Green.

In addition to the fossils named for him, Dr. Shrock's awards and honors included Fellow of the American Academy of Arts and Sciences (1954), President of the Society of Economic Paleontologists and Mineralogists (SEPM) (1956-57), President of the American Association of Geology Teachers (1959), an additional honorary Doctor of Science degree from Indiana University (1971), and the Twenhofel Medal from the SEPM (1976). He served as Corporation Member, Trustee, and Executive Committee member of the Woods Hole Oceanographic Institution, which named an oceanographic research ship after him. He was a member of the Alumni Council of the Department of Geology at Indiana University for many years. He was also a member of many professional geological societies and served on numerous review and visiting committees. Finally, the endowed Robert R. Shrock Professorship in the current Department of Earth, Atmospheric and Planetary Sciences at MIT is named in his honor.

After his retirement, Dr. Shrock wrote two books on the history of geology: The Geologists Crosby of Boston and the two-volume work Geology at MIT: 1865-1965. His great energy and enthusiasm even toward the end of his life were further evidenced by his completion,

at the age of 85, of the biography Cecil and Ida Green: Philanthropists Extraordinary.

Dr. Shrock is survived by his wife, Theodora Weidman Shrock of Lexington, Massachusetts, a daughter, Wendolyn T. Shrock, of Northfield, Massachusetts. a son, Robert E. Shrock, of Setauket, New York, two granddaughters, Alexandra Dominguez and Christine Lee Shrock, and by his sisters Miriam Rody and Virginia Shrock of Kokomo, Indiana, Evelyn Lavrenz of Plainfield, Indiana, Dorothea Littler of Syracuse, Indiana, and Clea Berry of Colliersville, Tennessee.

A memorial will be held at the Department of Geological Sciences, Indiana University, and at M.I.T. at a later date.

## ALUMNI NEWS

**Alexander, Richard** - M.A., Ph.D. (1972)

professor at Rider College presented a talk on December 10 in Bloomington at the Geology Colloquium entitled "Burrowing Rates of Bivalve Species and their Distribution across Sediment Texture Gradients."

**Branam, Tracy** - M.S. (1991)

is Research Scientist for the Indiana Geological Survey and in charge of water geochemistry. He is currently working on a proposal to evaluate fluoride content of ground water in the southwestern portion of Indiana. A major focus is to determine if the fluoride originates from a specific lithology or is generally dispersed in the ground water system.

**Brockman, Allen** - (M.S., 1986) and

**Brockman, Jenni Hill** - (M.S., 1987)

visited the Geologic Field Station in June 1992. Allen currently works for the Water Resources Division of the U.S. Geological Survey. He and Jenni generously shared their varied work experiences with faculty and students at the Station.

**Buchholz, Don** - B.A.(1955) M.A. (1961)

visited the Geologic Field Station in July 1992. He is President of Don Buchholz & Associates, Consulting Economic Geologists. Don has spent 35 years as chief geologist, exploration manager and vice-president of mining companies with experience in North, Central and South America, Australia, New Zealand, Fiji, Papua-New Guinea and the Islands.

**Butler, Brian** - M.S. (1989)

is employed by A.B.B. Environmental Services, now concentrating on chromium chemistry around steel mills. He may move to the Indianapolis office and continue studies of the Gary area.

**Cameron, Don** - M.A. (1954)

recently retired as Manger of Stratigraphic Sciences for Chevron Overseas Petroleum, Inc. in San Ramon, CA after a 38-year domestic and international career with Chevron and its overseas affiliates in Saudi Arabia and the United Kingdom. He and his wife Barbara have relocated to Franklin, Tennessee.

**Carney, Brett** - B.S. (1984) M.S. (1990)

was promoted to senior associate at Hanson Engineers, Inc., a multidisciplinary engineering and environmental consulting firm headquartered in Springfield, Illinois. He has been with the company since 1986. He is a hydrogeologist, and a manager of the geosciences section of the environmental/waste management department.

**Carpenter, Mike** - B.S. (1970) A.M. (1978)

is currently studying seepage erosion and deformation of sand bars along the Colorado River in the Grand Canyon as part of the sediment transport portion of the Glen Canyon Environmental Studies Project. Mike also reports that he took his dad, Jerry Carpenter, now retired from the Indiana Geological Survey, on a Grand Canyon raft trip in the summer of 1991. Jerry jumped out and swam the 217 mile rapids with the rest of his raft mates!

**Carpenter, Stan** - B.S. (1986)

received an M.S. degree in geology from Ball State University. He is currently employed as a senior geologist at Geraghty & Miller, Inc. in West Chester, Pennsylvania.

**Cass, John T.** - M.S. (1954)

still does consulting work, in Nevada and more recently in the Republic of Georgia.

**Dershin, David** - B.A. (1990)

is teaching earth sciences at Riverside-Brookfield High School in Riverside, Illinois. During the summers, he is Director of Evanston Aquatic Camp in Evanston.

**Earle, Rob** - B.S. (1987)

is working as a geoscientist for McLaren/Hart Environmental Engineering Corp. in Philadelphia. He is currently consulting major industries concerning compliance with RCRA, CERCLA, and state (Delaware,

New Jersey, and Pennsylvania) environmental regulations. He specializes in providing computer groundwater modeling services for hydrogeologic investigations.

**Ebbott, Kendrick - M.S. (1985)**

is employed with Sinor Hydro-Search of Milwaukee as a senior hydrogeologist/project manager. Sinor Hydro-Search is a ground water consulting and engineering firm with a primary emphasis on environmental work.

**Gemmer, Tim - B.A. (1990)**

is now working on a post-baccalaureate certificate in accounting at Indiana Purdue University at Fort Wayne. He expected to take the CPA examination in May 1993.

**Gibson, Dick - B.S. (1971)**

is running his own company, Gibson Consulting in Golden, Colorado. Since 1989 he has specialized in work on the former Soviet Union, preparing a detailed interpretation of the magnetic map of the entire country for hydrocarbon exploration. For the past five years, he has served as a volunteer instructor for G429 in Montana. Gibson Consulting is providing matching funds for all individual contributions to the Geologic Field Station Maintenance Fund to \$5,000 per year through 1999.

**Graham, Michael - M.A.(1978) Ph.D. (1983)**

Center Manager of Earth and Environmental Sciences, Battelle Pacific Northwest Laboratories, presented a seminar in Bloomington on career opportunities in environmental studies and hydrogeology. Mike also is our current President of the Advisory Board.

**Greenberg, Seymour - M.A. (1953) Ph.D. (1959)**

retired in 1992 after 28 years of teaching and leadership at the Department of Geology and Astronomy, West Chester State University, West Chester, Pennsylvania.

**Hidore, John W. - B.S. (1983)**

is currently working as Development Geologist for Unocal in the Michigan basin. He was recently transferred from Lansing to Sugarland (Houston), Texas.

**Hoch, Tony - B.S. (1988)**

was recently awarded a Department of Energy graduate fellowship. He is currently working on a Ph.D. in geochemistry at the University of Wyoming in cooperation with the U.S.G.S. Water Resources Research Division in Boulder.

**Hoover, Peter R. - M.A. (1966)**

is now serving as a Director (1992-1994) of the Association

of Earth Science Editors.

**Johnson, Richard - A.B. (1950)**

retired in 1990, never having worked a day in geology.

**Keeling, Lindsay Hood - M.S. (1987)**

and her husband Bennett (8/90) stopped by for a brief visit in the Department in March. They have a son, Garrett Jamison, born on November 11, 1992.

**Kleschen, Mary Zeita - B.A. (1979)**

is a family physician living in Guam and working in a group practice. She is enjoying motherhood (Katherine Zeita Michels, born July 18, 1992) and life in the tropics.

**Kues, Barry S. - Ph.D. (1974)**

has been Chairperson since 1991 of the Department of Earth and Planetary Sciences at the University of New Mexico in Albuquerque, succeeding Steve Wells (B.S., '71) also an I.U. alumnus.

**Laney, Robert L. - M.A. (1960)**

has retired from the Water Resources Division of the U.S. Geological Survey after more than 30 years as a hydrologist. He has since joined the ground-water consulting firm of McDonald Morrissey Associates, Inc. in Reston.

**MacDaniel, R. Patrick - A.B. (1972)**

began a new job as Senior Geologist with the Kuwait Oil Company after nine years with BHP in Australia and Burma. He is assigned to the West Kuwait and Wafra area.

**McGrain, Preston - B.A. (1940) M.A. (1942)**

contributed three articles to The Kentucky Encyclopedia, a single-volume reference work published in 1992 to help celebrate the Commonwealth of Kentucky's 200th anniversary of statehood.

**McKay, Edward D. - B.A. (1949)**

has been retired for six years; he still does some petroleum geology in Michigan and works as a docent at the Michigan Historical Museum.

**Mack, Greg - M.A. (1975) Ph.D. (1977)**

is current Chair of the Department of Geology at New Mexico State University.

**Mathews, David - B.S. (1959) M.A. (1960)**

retired from Unocal on August 1, 1991 and is currently enjoying gardening, golfing, fishing, hiking and various

civic endeavors. Volcanic ash, he has learned by living in Alaska, is good for the lawn and garden. He also has become fairly accurate at estimating the Richter scale magnitude of the occasional seismic activity.

**Markisohn, Brad** - M.S. (1985)

is currently working as a design engineer for Boehringer Mannheim, Inc. in Indianapolis.

**Nellist, Bill** - M.S. (1986)

has been employed as a cartographer with the Defense Mapping Agency since September 1992.

**Nicoll, Robert** - B.S. (1964); M.A. (1967)

is a principal research scientist with the Australian Geological Survey, Canberra. He presented two brown bag seminars in Bloomington in March on conodonts and their application to the study of the evolution of Australia.

**Reazin, David** - B.A. (1978) B.S. (1980) M.A. (1985)

is currently employed by the U.S. Environmental Protection Agency in Region 6 which covers the states of Arkansas, Louisiana, New Mexico, Oklahoma, and Texas. His job responsibilities in the Safe Drinking Water Program include being the Regional Mobilization Coordinator, who addresses issues related to state program capacity, small system initiatives, and public education initiatives to support the 1974 Safe Drinking Water Act. In May 1993, David completed requirements for an MBA degree in Management at the University of Texas at Arlington.

**Schmidt, Christopher** - M.A. (1968) Ph.D. (1975)

a professor of geology at Western Michigan University and an expert on the formation of the Rocky Mountains received a Fulbright Scholar Award to study a region of the Sierra Pampeanas Mountains in Argentina. This region is believed to be a modern analogue of the Rockies. He spent the fall semester of his 92-93 sabbatical at Cornell University (location of the largest library on South American geology) preparing for his field research during January-June of 1993.

**Shaffer, Elizabeth Eve** - B.S. (1990)

has been awarded the Cindy Aversen Memorial Prize for her service to the Division of Geological and Planetary Sciences of the California Institute of Technology. Eve also received a three-year grant from NASA to support her Ph.D. research.

**Steinker, Don** - B.S. (1959)

is the Managing Editor for the Journal of Paleontology and is National Editor of The Compass of Sigma Gamma Epsilon. He teaches paleontology at Bowling Green State University, Ohio.

**Taylor, S. Ross** - Ph.D. (1954)

was Visiting Professor in Geochemistry at the University of Vienna, Austria, in 1992. His book entitled Solar System Evolution: A New Perspective was published by Cambridge University Press, New York in October.

**Thomas, Margaret** - B.S. (1986) M.S. (1989)

Meg has taken a new job with Woodward-Clyde consulting in Houston, Texas.

**Thompson, Glen** - Ph.D. (1977)

currently owns and manages a company in Tucson, Arizona that specializes in making instrumental measurements of soil contaminants.

**Torrens, Mark** - B.S. (1976)

After leaving I.U. entered the Rochester Institute of Technology and earned a Bachelor of Electrical Engineering Technology degree. Since that time Mark has been employed by Eastman Kodak in Rochester, NY.

**Tweddale, John B.** - M.S. (1987)

is Senior Project Hydrogeologist at ERM-North Central, an environmental consulting firm in Deerfield, Illinois. He and his wife, Jenina, have been traveling whenever and wherever possible. Scotland was a recent, awe-inspiring adventure.

**Wier, Charles** - A.B. (1943) A.M. (1950) Ph.D. (1955)

was awarded the Richard Owen Award for distinguished alumni of the Department and presented his Owen Memorial Lecture entitled "Perspectives on Education and Opportunities in Geology" on March 8, 1993.

**Yates, Marty** - Ph.D. (1987)

is currently Research Assistant Professor at the University of Maine. He directs the microprobe laboratory and is busy with studies of massive Zn-Cu sulfide deposits in Maine and probe-related projects in Siberia and Sweden.

## DONORS, 1992

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*The deaths of the following alumni have been reported to us since the last Alumni Newsletter.*

**Bieberman, Doris Franz** - B.A. (1945)  
was a homemaker in Socorro, New Mexico.  
(January 24, 1993)

**Frey, Robert** - M.A. (1967) Ph.D. (1969)  
Professor of Geology, University of Georgia, Athens,  
Georgia. (January 1, 1992)

**Shrock, Robert R.** - B.A.(1925) M.A.(1926) Ph.D.(1928)  
honorary member of the Alumni Council/Advisory  
Board of the Department passed away at his home in  
Lexington, Massachusetts. An obituary appears earlier  
in this newsletter. (June 22, 1993)

*We would like to extend our deepest sympathy to family and friends of the deceased.*

## ACKNOWLEDGMENTS

The Newsletter was compiled and edited by David Towell with major assistance from Sarah Burton and Kim Schulte. Help from Lee Suttner and Barb Hill was also appreciated. The College of Arts and Sciences Alumni office contributed partially to offsetting the printing expenses as well as mailing costs. The Alumni mailroom handled distribution. We appreciate their assistance.

\* \* \* \* \*

We urge you to send us prints, photos, or slides that would interest our readers. Please be sure to label with your name and address so that they can be returned and also provide a complete caption. We can't promise to include all submissions but can promise to return yours.



Sohio sponsored sedimentary geology trip. (L to R) Kneeling: Ken Ridgeway, Pam Carter, Ann Petricca, Peter DeCelles, Jim Howard, Howard Feldman. Back Row: Dennis McGrath, Tim Salter, ?, Kim Nelson, Todd Thompson, A. Basu, Rich Flores, Dave Grewster, Gordon Fraser, ?, Al Shultz. (Not pictured is Lee Suttner -

recovering from an injury suffered during encounter with flag pole while running a deep down and out (literally) pass pattern in a football game.) Can you help identify the people in question?

Please fill out this sheet and return it to us so we have your news for the next newsletter. If you have a change of address, be sure to include it.

NAME:	DEGREE(S):	YEAR(S):
ADDRESS:		
MY NEWS IS:		

Please check if you would be willing, if contacted, to consult with our graduates concerning employment, career choices, etc., in your geographic area and/or with your company:

Please mail this sheet to:

Lee J. Suttner, Chair  
Department of Geological Sciences  
Indiana University  
1005 East 10<sup>th</sup> Street  
Bloomington, IN 47405



**ADVISORY BOARD MEETING, MARCH 1993**

Front Row (L to R): *Robert Blakely, Ann Marie Petricca, Thomas Straw, George Nevers, Marica Engle, Lee J. Suttner, Michael Graham, Richard Gibson, and Robert Boyer.*

Back Row (L to R): *Malcomb Boyce, Frank Pruett, Judson Mead, Steven Young, Christopher Smith, Daniel Tudor, Stanley Anderson, and Wayne Bundy.*



**BACK ROW** - Larry Onesti, Chris Carlson, Dave Towell, John Hohman, Dmitriy Repin, Mike Savarese, Arnim Fluegge, Ruth Droppo, John Jasper, Jennifer Lewis, Charlie Miller, Matt Paige, Robert Wintsch, Neill Vaughn, Kristian Schneek, Chris Dintaman, Michael Kaderabek, and Nelson Shaffer

**FIFTH ROW** - Bruce Douglas, Mike May, Gary Pavlis, Barbara Grehl, Lisa Pratt, Andrea Wright, Dan Carson, Yifeng Wang and Iskandar Taib

**FOURTH ROW** - Mike Dorais, Xiaodan Song, Steve Baedke, Joe Callis, John Droste, Ruiliang Wang, Kathleen Dull, Chris Gellasch, Sara Elbert and Zimin Gao

**THIRD ROW** - Haydn Murray, Clayton Millard, Steve Bennett, Graham Logan, Brian Keith, Enrique Merino, Yutian Wang, Silvana Bertolino, Cara Davis, Mohammad Iqbal, Huitang Zhou and Bob Dodd

**SECOND ROW** - Gary Bennett, Matthew Averill, Liangqiao Bian, Mark Monk, John Guthrie, Jean Reese, Brian Snow, Emmanuel Ramos, Cliff Ambers, Lisa Rhoades, Peter Braendlein, Sujoy Ghose, George Hai Chao Yu, Ana Marie Carmo, Sue McDonald, Glenn Bear and Ed Ripley

**FRONT ROW** - Stephen South, Penny Alano, Jason Mastrine, Rodney Ward, Elaine Oehmich, Charles Vitaliano, Rebecca Robinson, Lorie Bear, Lorie Canada, Kim Schulte, Sarah Burton, Kristin Leckrone, Amanda Austin and Terry Stigall

## **GEOLOGICAL SCIENCES SENIORS, GRADUATE STUDENTS, FACULTY AND STAFF**