

ROUND UP

1991

Department of Geological Sciences

University of Kentucky

DIRECTORY

Department of Geological Sciences
University of Kentucky
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* Joint with Agronomy

DEPARTMENT CENTENNIAL 1992

Board of Trustees meeting July 26, 1892, appointed A.M. Miller to Department of Geology.

Although courses titled geology had been offered earlier, the Board of Trustees meeting in 1892 is the first official reference to the Department of Geology at the University of Kentucky. The first courses in geology were offered in 1865-1866 and taught by Prof. Alexander Winchell. From those first courses and the founding of the department in 1892, the program in geology has evolved in many ways, through many years in the building named for Dr. Miller, to the present richness of diversity of programs in the Department of Geological Sciences.

As we plan for the future, this is an appropriate time to celebrate our past, and together - alumni, faculty, students, and friends - we will make the year 1992 and academic year 1992-1993 a memorable time for the geological sciences in Kentucky.

The following events are scheduled:

February 8, 1992

Colloquium - "New discoveries concerning the crustal structure of Kentucky"

April 10-12, 1992

Spring Centennial Celebration at the Department of Geological Sciences

October 25-29, 1992

Geological Society of America Meeting, Cincinnati, Ohio, including a special UK alumni meeting and a GSA field trip dedicated to the centennial

October 30-November 1, 1992

UK Homecoming, a block of tickets has been reserved for the homecoming football game, and other activities will center around the department

April 16-18, 1993

Spring Centennial Celebration at the Department of Geological Sciences

Both of the Spring Centennial Celebrations, and the 1992 Homecoming will include special events: field trips to Burdette Knob and Clays Ferry, boat trip on the Kentucky River, symposia on selected topics, picnics, banquets with some very special after-dinner speakers, and open house in the department.

You will be receiving registration materials for these events (except that **this is your invitation for February 8, 1992**), but please mark your calendars now. We hope to see you in Lexington several times in the next two years!

DEPARTMENTAL NEWS

General State of the Department

For the Department of Geological Sciences, this is an exciting time. Despite continuing recessions in most of the industries that provide employment for geoscientists, and despite shortfalls in state revenue, we are doing relatively well in most areas. The number of undergraduate majors is approaching "normal" (about 45), and the number of graduate students has been holding steady at about 30. In the University Studies courses, enrollment has doubled in two years, and now exceeds 500 each semester. Options to historical geology as the second course for non-majors now include courses in environmental geology, history of the vertebrates, and mineral resources. In the value of grant-supported research, the Department of Geological Sciences now ranks sixth among the departments in the College of Arts and Sciences (the rank improves to fourth, calculated as an average per faculty member). We continue to be favorably supported by contributions, thanks to our alumni!

Curriculum Revision

Next fall, the Department of Geological Sciences will initiate a new departmental core curriculum for all B.S. degrees in Geological Sciences. The core will include optical mineralogy, petrology, structural geology, and experience in field geology for all undergraduate majors. Undergraduate majors choose one of four emphases: geology, geophysics, environmental geosciences, or hydrogeology. The distinctive nature of each of the emphases is in specialized and supporting courses in and outside the department. The new core gives students flexibility in transferring between emphases, and it enables a structured curriculum plan for scheduling.

Building Renovation

Our long-awaited, full-scale renovation of the Stone Building to become the home of the Department of Geological Sciences has been derailed by budget problems. We still deeply need a suitable

home, but for now we will do the best we can with what we have. We are presently using several rooms in the Slone Building, even though they have not been renovated to our specifications. In addition to our primary space assignment in Bowman Hall, the Department of Geological Sciences has labs and office space in Research Facility No. 1, Kastle Hall, Mining and Minerals Research Building, and Funkhouser Building. The space in Funkhouser is for our University Studies courses and includes a lecture room (capacity 208) and one teaching lab. The lecture room is being renovated slowly to our specifications, and we hope to gain an additional teaching lab. We plan to add wall maps and other displays in these rooms to give the general students a distinctive introduction to the geological sciences. Finally, those of you who loved the dirty, faded, torn shower curtains that partly closed the rest-room stalls in Bowman Hall will be saddened to learn that doors have been installed.

Faculty and Staff Changes

Lyle Sendlein completed one and one-half years as Acting Chairman in December, 1990, and returned full-time to the duties he also had while he was Acting Chairman. The Department of Geological Sciences expresses its thanks to Lyle for a job well done.

Bill Thomas was appointed Chairman, effective January, 1991. Among other things, he now has an office in Bowman Hall, where he lived in a dorm room in 1953.

Kieran O'Hara has been promoted to the rank of Associate Professor with tenure.

Steve Moshier left the department after six years to join the faculty of Wheaton College.

Charlotte Allen completed two years as a Visiting Assistant Professor and is now in a post-doctoral research position in Australia.

Dave Moecher was appointed Assistant Professor, effective August, 1991. His research is in metamorphic petrology, and he will make extensive use of the microprobe.

Neel Chatterjee has been appointed to the position of microprobe technician.

Charles Ratté was appointed Visiting Professor, effective August, 1991. He has just retired as State Geologist of Vermont, and he brings extensive experience to his teaching.

Jim Drahovzal, who is with the Kentucky Geological Survey, has been appointed with adjunct status in the department.

Jim Hower has been promoted to the rank of Adjunct Associate Professor.

Debra Smith joined the department staff as Administrative Assistant in May, 1991, and Judianne Lesniewski joined the staff as Staff Assistant in July, 1991. They have replaced Nadine Kennedy, who moved to California, and Margie Palmer, who moved to Florida. Both Debra and Judianne bring professional experience and dedication to their jobs, and the business of the department is conducted efficiently and cheerfully.

Electron Microprobe Upgrade

In January of 1989 the Department of Geological Sciences installed an Applied Research Labs SEMQ electron microprobe for quantitative and qualitative analysis of earth and industrial materials. The instrument was purchased with funds made possible by a bond issue administered by the Office of the Vice Chancellor for Research. Unfortunately, the instrument could not be maintained in an operational mode. Now, fortunately, the University has agreed to provide start up funds for a major instrument upgrade and salary for a lab manager who will oversee the day to day operation of the lab. Dr. David Moecher is in charge of directing the lab operations, and in November, Dr. Neel Chatterjee became the lab manager.

The funds provided to upgrade the microprobe will make it a state of the art instrument. Additions to the probe will significantly expand its analytical capabilities in geology and material science. These include a new, PC-based operating system; an enhanced back-scattered electron imaging system; a light-element energy-dispersive system for detecting elements as light as B; a synthetic multilayer diffracting crystal for quantitative analysis of light elements such as B, C, O, and N; and a new data reduction program that will allow quantitative analysis of thin superconducting films. The latter will have applications in material science and physics. We intend for the microprobe to be open to the entire University research community.

When you are in town, please stop in and see the facility.

Undergraduate Hydrogeology Emphasis

A hydrogeology emphasis for the Bachelor of Science in Geological Sciences has been approved and several undergraduates plan to meet its requirements. It differs from the geology emphasis mainly in requiring fewer geology courses but additional work in math (including 2 years of calculus), chemistry, and engineering.

FACULTY NEWS

Frank Ettensohn

My work in black-shale studies continues, not only in the Devonian-Mississippian black shales of Kentucky but also in Ordovician black shales from the Appalachian basin. In recent years, my research has also taken a new trend, namely the relationship between sedimentation and tectonics via lithospheric flexure. Although it was black shale that initially led me to lithospheric flexure, it turns out that flexural models are strong tools for working with all sorts of foreland-basin lithologies, especially during times of orogeny. As a result, on a basinal scale, I am now working with carbonates and coarser clastic rocks in addition to black shales.

Because of the importance of black shales as source beds and as potential oil and gas shales, it seemed like it might be important to develop some type of uniform system of descriptors for black-shale cores. To this end, last year I received a grant from the Bureau of Mines through Institute for Mining and Minerals Research to develop a preliminary core logging manual for rocks within and adjacent to the Devonian-Mississippian black shales of Kentucky. The manual is now being reviewed.

Soon after the preliminary manual was finished, I left for a three-week trip to Siberia where I participated as a speaker and as a member of the organizing committee for an international meeting on black shales. After the week-long meeting in Novosibirsk, which is where I lived as a Fulbright professor two years ago, I participated in a week-long field trip to north-central Siberia where we examined Cambrian and late Proterozoic black shales, some of which contained gold deposits. The Russians told us that at least 60% of all the organic matter ever deposited was deposited during the Proterozoic, and after seeing the extensive Siberian black-shale deposits, I can believe this. In Siberia, these shales contain economic deposits of gold and sulphide minerals, so we spent much of our time deep in the "bowels of the earth", where no westerners had been before. Our food and living conditions were generally poor, and transportation in these remote regions was largely by boat and helicopter, but the trip was well worth it. After returning from this trip, friends in Novosibirsk arranged for a four-day trip to the Altai Mountains near the Mongolian border to see their student field camp area, which is a highly glaciated, mid-Paleozoic suture zone. The

physiography and climate are very much like those of Colorado. Hopefully, we may be able to work out student and faculty exchanges between field camps in the future.

I returned from the Altai Mountains just in time to find out about the attempted coup. By the time I reached Moscow on the third day of the coup, after a two-day train trip, it had failed. I had hoped to get pictures of tanks and the like in the streets of Moscow, but was disappointed. After the failure of the coup, however, Moscovites really celebrated. I have never seen the Russians so happy!

John Ferm

This has been a busy year for John. In the fall he had a visiting professor in coal geology from the University of Beijing on the campus and in the summer Jerry Weisenfluh and Jim Staub from the University of Southern Illinois returned the visit to China. Plans were made for a cooperative study between Chinese geologists and geologists at UK and Southern Illinois.

During the year a project studying sandstone bodies in eastern Kentucky was completed by two post doctoral students from Royal Dutch Shell. (There is no better way to see reservoir analogues than the large road cuts in eastern Kentucky.) A project was also begun in cooperation with the Arch Mineral Company of St. Louis to work out the pattern of vertical and horizontal variation in coal-bearing rocks in Harlan County. This combined with a recently completed thesis by Mike McClure in Dickenson County, Virginia, and an on going dissertation project with Dennis Lewellen in Buchanan County should provide a reasonable assessment of the geology in the most rapidly subsiding portion of the Pocahontas basin.

In the area of coal mining, progress toward the understanding of central problems was made by mine studies in Harlan and Letcher Counties by Jerry Weisenfluh and by Mark Scanlon in Grant County, West Virginia. Work is also progressing on producing rapid and accurate descriptions of coal seams using simple field observations backed up by petrographic image analysis.

John also was the recipient of the Gibert Cady Award from the Coal Division of the Geological Society of America for his contribution to coal geology.

Support for his research amounted to about \$100,000.

David Moecher

Having just joined the faculty in August, I should introduce myself to alumni. I received my Ph.D.

from the University of Michigan (1988) and have spent time at the USGS and SUNY-Stony Brook as a research associate. My research interests include studies of the pressure-temperature-time evolution of metamorphic belts, and fluid-rock interaction. I am currently working on projects in Connecticut and Ontario. I was hired as the "token" petrologist in a department having a strong emphasis on sedimentology and tectonics. As a metamorphic petrologist, however, my research interests overlap with the tectonics types (I'm interested in what's going on deep within fold and thrust belts) and sedimentologists (I've never met a metasedimentary rock I didn't like, and after all, coal is just a low-grade metamorphic rock!). I will be teaching mineralogy and the igneous/metamorphic sequence, in addition to a section of introductory geology to keep me honest.

I feel I have some roots in Lexington (well, seeds maybe). My Ph.D. advisor (Eric Essene) grew up in Lexington, and his father was on the faculty of the Department of Anthropology. So I guess I am somewhat of a pilgrim returning to the home of the master. For my wife Amy and me, Lexington is a breath of fresh air, after having lived in crowded east coast urban areas. We look forward to long and productive lives at the University and in Lexington.

Bruce Moore

I have continued to develop a new low-altitude method of detecting microfractures, by multispectral imaging from light aircraft. The method has been particularly successful in the detection of hydrocarbon seeps from oil and gas deposits in exploration.

I have been working in Australia on the production of methane gas from coal in the Bowen basin of Queensland. Other ongoing exploration projects are for gold and tungsten in California, Arizona, and Nevada, and oil and gas in Kentucky, Kansas, and Oklahoma.

I am currently teaching engineering geology, petroleum exploration, and remote sensing.

Kieran O'Hara

Over the past year my main activities have been directed toward bringing ongoing research projects to fruition. This is what some people call "post-tenure momentum". Since being promoted to Associate Professor, I have taken over from Sue Rimmer as Director of Undergraduate Studies at the Department of Geological Sciences (DUGS at DOGS). The number of undergraduates in introductory courses has been steadily increasing, reversing a national trend of low geology enrollment. The number of our majors has also increased. We now have approximately 45

majors; a fair percentage is in the Environmental Geoscience emphasis, which has an interdisciplinary flavor.

In terms of research, I spent most of the summer writing up the results of previous studies. Graduate student Amy Haak's thesis, which she defended in February, has been accepted for publication in the *Journal of Structural Geology*, and Amy herself is working for Texaco in New Orleans. The fluid inclusion work I have been pursuing in New England has led to the important conclusion that Triassic extension caused rapid uplift of the basement rocks in New England. Much of the geology of New England may be better understood in the context of this extension rather than compression. This study has recently been published in the *Journal of Metamorphic Geology* (1991).

Last summer while on a field trip led by graduate student Wes Combs and Nicholas Rast in the Blue Ridge province of North Carolina, we found a most unusual fault rock, which on the basis of chemical analysis, turned out to be the product of melting due to frictional heating on the fault. If correct, we have the distinction of finding the first occurrence of pseudotachylyte in the southern Appalachians. This study has been accepted for a special issue on Pseudotachylytes in *Tectonophysics* and is due out in early 1992. In terms of new topics, currently I am working on a theoretical model for cooling of thrust sheets which explains a "bull's-eye" pattern of coal metamorphism in Alabama. This unusual pattern was pointed out to me by our new chairman, Bill Thomas, at a conference in Lexington in 1989. The rest of my time this semester is taken up teaching the Saturday field course and a graduate course in advanced structural geology.

Nicholas Rast

For 1990-1991, Dr. N. Rast has been invited to assume the position of the Chairman of the Technical Sessions at the 1992 Annual Meeting of the Geological Society of America in Cincinnati and in the same connection as the incoming national Chairman of the Technical Program Committee of GSA.

The meeting in Cincinnati is going to reflect Columbus's discovery of America and, at the same time, the centennial of the Department of Geological Sciences, UK.

As before, in research, Rast works both in the northern Appalachians and in the Appalachians of Kentucky-Tennessee and North Carolina. Regarding the work in the northern Appalachians, he has been invited to conduct a geological excursion for New England Intercollegiate Geological Conference.

In teaching this year, tectonics, structural geology, and advanced general geology have been my responsibility. Since January 1, 1981, Nicholas Rast has been North American executive editor of the *Journal of Geodynamics*.

Charles A. Ratté

Dr. Ratté, recently retired State Geologist of Vermont, is visiting professor for the academic year 1991-92. Dr. Ratté's background and experience in the environmental programs of Vermont's Agency of Natural Resources are adding a measure of first hand, practical enhancement to the environmental geology offerings in the Department.

Sue Rimmer

It has been a busy year, full of new projects and few new faces. The new year saw the arrival of Liane Alessi and Jennifer Thompson. Liane (who is one of our T.A.s) is working on an M.S. degree and is examining the clay mineralogy and geochemistry of sediments associated with the No. 13 coal (western Kentucky). This is a project we started with Steve Moshier, and it's our excuse to get Steve to come and visit every now and then, now that he has gone on to teach at Wheaton College in Illinois. Liane is a great addition to the program! Jennifer is supported by the Fellowship in Organic Geochemistry and Petrology (sponsored by the University of Kentucky Center of Applied Energy Research) and a Graduate School Fellowship. Jennifer returned to school after eight years in research and exploration with Shell Oil. Jennifer and I have known each other since our Penn State days and are having a great time working on organic facies in Devonian shales (Jennifer's Ph.D. topic) with Tom Robl at the CAER. In addition, Jennifer and I are looking at the effects of overpressuring on organic maturation parameters (through a grant from Shell Development Company) and are looking at a variety of maturation problems with colleagues at Amoco Production Company.

Other exciting developments include the work on the Pond Creek coal that Dan Vogler is pursuing. In addition to being a T.A., Dan is working with the geologist at Mapco Coal Company (John Popp) in a study of one of their mines in eastern Kentucky. Yalan Tang, who is pursuing her Ph.D. research on the coal petrology of the Fire Clay coal seam, has been selected as the 1991 recipient of the Antoinette Lierman Medlin Scholarship Award, presented by the Coal Geology Division of the Geological Society of America. We are very proud of Yalan; the competition for these awards is very stiff! This summer, Yalan will be working with Mobil in Dallas.

In the new year, John Ferm and I are looking forward to the arrival of three more Ph.D. students who will be pursuing work in coal and organic petrology. One of these students (Chris Toles) will be working on the geochemistry and petrology of activated carbons produced from coal through collaboration with the CAER.

I have been on sabbatical during the Fall semester and it has been quite productive. I chose to stay here in Lexington and have been able to pursue some new research areas and avenues for funding. In addition to working with my graduate students, in my "spare" time I have been working on carbon deposition on retorted shales (with Aurora Rubel, CAER), petrographic studies of activated carbons (with Frank Derbyshire, CAER), petrography of Moroccan oil shales (with Tom Robl, CAER), and clay mineralogy of bottom sediments (with Bill Blackburn, University of Windsor). The x-ray and coal labs continue to run more or less smoothly, depending on how much funding I manage to squeeze out of the various sources. This year, Rigaku very generously updated our automated X-ray diffraction equipment to an IBM-based system. We are, of course, delighted to have such a user-friendly system on board!

A high point of the year was the 8th Annual Meeting of The Society for Organic Petrology that I co-hosted with Jim Hower (CAER) here in Lexington. For those of you not familiar with this international group, it includes individuals involved in a wide variety of research efforts in organic geochemistry and petrology (oil and gas, coal, oil shales, coke, to mention a few). I have been involved with this group for some years now, and I am currently serving as the President. We had over eighty participants in the meeting that included two days of technical sessions, a one-day workshop, and a field trip. The success of the meeting was due largely to the efforts of my colleagues at the CAER. Many Thanks!

In all, it has been a busy and exciting year in our group and we look forward to another good year in 1992.

Lyle Sendlein

Last year I completed the last half year as Acting Chair of the Department. I was really glad to see Bill and Rachel Thomas come to Lexington last December. Other administrative activities include the leadership of the Institute of Mining and Minerals Research and the formation of the Kentucky Groundwater Consortium. This consortium will include faculty members from the University of Louisville, Eastern Kentucky University, Western

Kentucky University, Murray State University, and Morehead State University.

Seven graduate students under my supervision (with assistance from James Dinger of the Kentucky Geological Survey) graduated this past year, all with MS degrees. They are Karen Fitzmaurice, Robert Money, Robert Baumgardner, Todd Fickel, Dan Moore, David Holt, and Arsin Sahba. We presented some of our research results at the GSA in Dallas (Arsin Sahba) and at the Kentucky Water Resources Research Institute meeting in Lexington (Shelley Minns, Robert Baumgardner, Dan Moore, and Arsin Sahba).

Jim Dinger and I have a number of research projects centered in Kentucky. We are investigating groundwater ideas that range from fracture flow in Appalachian rocks of eastern Kentucky to the carbonate rocks of the Mississippian and Ordovician/Devonian of central Kentucky. The challenge for us is to find out how we can protect the groundwater resources in the karst regions from urban and rural pollution sources.

We have expanded our computer capabilities with the purchase of a 386 PC, 3' x 4' digitizer, hard disk system (Bernoulli Box), large eight pen plotter, and a variety of software to solve problems, store data, and print maps, figures, and graphs. All of our students are learning how to utilize these systems as part of their thesis work.

I have really enjoyed the rejuvenation of my research effort and have identified several areas to attack. Because of the almost total lack of groundwater data in Kentucky, identifying areas of research that need to be addressed are limitless. I plan to work on identification of aquifers in eastern Kentucky coal fields and to explore better ways to monitor human activities in karst terrains. Sure have enough work and students to keep busy for a while.

Ron Street

During the past year the Seismic Lab has moved into its new quarters in the Stone Building, and the facilities have been greatly improved. The Kentucky Digital Seismic Network now consists of 11 bore hole stations that are recorded digitally in the lab, 4 free-field strong-motion digital accelerometer installations, the only vertical strong-motion array in North America outside of Parkfield, California. For this coming year, we will be installing the first 3-dimensional strong-motion array in North America outside of California, and additional free-field strong-motion digital accelerometers. The purpose of the 3-D array will be to study wave propagation, shear-wave polarization, and site effects in the northwest trending arm of the New Madrid seismic zone.

In addition to expanding and upgrading the seismic array, we have been able to achieve one of our long term goals of providing each of the graduate students in the lab with his or her own computer and printer. There are currently five graduate students in the lab, and each has a 16 Mhz 286 PC with printer. The next goal is to phase out the 286's with the faster and more versatile 33 Mhz 486 PC's and to network the better machines, plotters, and printers together.

We have also been busy trying to finish a 3-year study concerning the effects of a damaging earthquake in the New Madrid or southern Illinois seismic zones on Paducah, Kentucky. Most of the work involved high-resolution seismic (P- and SH-wave) reflection and refraction profiling; the limestone basement is typically 350 to 500 feet below the surface. The study is nearing completion, and is shaping up to have been well worth the effort.

Bill Thomas

Last year started in Tuscaloosa, Alabama, and ended in Lexington, Kentucky. The events between included moving! Having moved several times, the activity was not new, but the schedule was. Our previous moves had been made during the summer between academic years, and we found that the process of packing, moving, and unpacking took all summer. This move occurred during Christmas break between the fall and spring semesters. All of the activities and stresses that usually were spread over three months had been compressed into two weeks. It was like eating 21 meals in one day and not needing to eat again for a week. Then on January 3, I arrived on the job in my new office, and when I looked up it was May.

Graduate students who were working with me at the University of Alabama were only minimally interrupted. Rob McDowell, a Ph.D. student, transferred to UK and will complete his degree here. In March, I went to Tuscaloosa for the thesis defense of Mike Nix, my last M.S. student there. Three new graduate students (Joe Allen, Lyle Mars, and Jim Montgomery) have arrived in Lexington, and my involvement with graduate student research is back to normal.

Since arriving at UK, I have been able to do some field work in Colorado, Montana, and Alabama. This work involves study of basement faults and the effects of synsedimentary fault movements on sediment distribution. In Colorado, I completed field work on stratigraphy across synsedimentary basement faults in the San Juan Mountains and visited Joe Allen who is doing dissertation research on a basement shear zone in the Sawatch Range. The trip through central Colorado included a visit to Cement

Creek and Crested Butte to check the possible facilities for our summer field camp. Crested Butte has changed a lot in 37 years! In Montana, my work on the Southwest Montana transverse zone and Rob McDowell's dissertation research in the Tendoy Range are aimed at better understanding of the controls on location and geometry of lateral ramps in thrust belts. For me, field geology continues to be as much fun as it was that Saturday in September, 1953, when a bunch of us followed John Stokley up the hill above the Old Crow Distillery!

John Thrailkill

I am being kept busy teaching courses to support the graduate and undergraduate hydrogeology programs and supervising master's and doctoral students (about three active and another three or four who are too busy working in hydrogeology to finish their theses). What other time I have is spent looking after the department's computer lab (which expanded to 2 rooms this past summer) and trying to continue my research into devising computer programs to model limestone aquifers.

This is my 27th year at UK, and my wife Lavine's 26th, and we have decided to try some other activities for a while, such as some extended cruises in a sailboat and maybe hiking the Appalachian Trail. Accordingly, we will both be taking slightly early retirement from UK in 1992; Lavine in February and I in May at the end of the spring semester.

ADJUNCT FACULTY

Jim Drahovzal

This is the beginning of my third year at the Kentucky Geological Survey where I am heading up the Petroleum and Stratigraphy Section (P&S). Our program is one of petroleum and regional geologic research, as well as service to the oil and gas industry of the State. Since becoming an Adjunct Associate Professor in the Department of Geological Sciences, I have been exploring ways for our two programs to interact in mutually beneficial ways. I have been involved in the formal advising of one of the department's doctoral candidates, Peter Goodmann, who has been interpreting seismic data in the Rome trough as part of his dissertation research. The Kentucky Geological Survey has also provided partial support for Peter's dissertation. This past summer, P&S also involved Doctors Rast and Allen and graduate-student Peter Goodmann in the Cincinnati Arch Consortium, an exciting multisurvey study of a newly discovered sedimentary basin beneath the

Cincinnati arch. Their research involved crystalline basement rocks of Kentucky, Ohio, and Indiana. The project focused on the relationship of the crystalline basement to the new sedimentary basin that has been called the East Continent Rift Basin. Finally, after several years interruption, Bill Thomas and I have continued our cooperative research on the geology of the thrust-faulted and folded Appalachians of Alabama.

Jim Dinger

Hello, Water Dogs and Puddle Puppies (for those of you who haven't spent your dues on a drilling rig as yet). The Water Resources Section of the Kentucky Geological Survey has been working with Lyle Sendlein and several graduate students supplying equipment, transportation, much needed advice and harassment, and money (the bottom line, isn't it) to get projects, theses, and dissertations completed. The major areas of effort are in the coal fields and non-point source pollution studies in agricultural settings. We are also working on ground-water quality in ash disposal sites at a major power company.

With regard to coal field hydrology, we are currently involved with setting up both ground and surface water monitoring at a site to be deep mined sometime in late 1993 or early 1994 (need lots of background data before the longwall miner comes through, drops the mountain 5 ft., and disrupts the water-bearing properties of the strata overlying the coal). Strain within the rock units will also be monitored as the roof crashes in. The Star Fire project continues with spoil wells drilled to 150 ft., and bedrock wells are being installed in Robinson Forest (Laurel Fork) as part of the cooperation between the university and Addington Coal Company who is the mining contractor. We've got drilling contractors installing monitoring wells in the bedrock and deep holes but find the hand auger to be effective down to 30 ft. in alluvial materials (it is reported that Sendlein reached 3000 ft. last summer, but nobody believes the reporter: himself!). We're into electrical data logging for water levels with mixed results (many of the loggers are shorting out due to moisture getting into the electrical system - anyone else having this problem, let's talk).

Non-point source studies are being carried out with the College of Agriculture and the Kentucky Division of Water. Nine sites are being looked at; some have monitoring wells installed and others will be attacked this Spring. We are looking at potential ground-water (dairy, beef, row crops, no-till) in different hydrogeological conditions (alluvium, karst, clastic bedrock).

Jim Hower

My affiliation is with the Center for Applied Energy Research in addition to having an adjunct appointment in Geological Sciences. My research involves applications of coal petrology and geochemistry to problems in coal geology and coal utilization. Over the past 13 years, I have cooperated on research with a number of the Geological Sciences faculty and provided access to research equipment for several graduate students.

EMERITUS FACULTY

William C. MacQuown

My consulting activity has now taken a back seat to public service and hobbies. This summer, I gave a workshop on rocks and minerals at Headley-Whitley Museum for eight to twelve year olds and my annual talk on the "Geology of the Kentucky River Pallasades." For this latter service I have been awarded the honorary title of "Kentucky Admiral" from the State Department of Natural Resources. For those of you attending one of the Spring Centennial Celebrations of the Department of Geological Sciences (April '92 or '93) Admiral MacQuown will offer participants and their families a taste of Kentucky River geology and scenery on the Dixie Belle stern wheeler from Shakertown marina. Don't expect cerebral pontification - just fun.

Retirement has given me a chance to combine my chess hobby with public service by coaching a grammar school chess club. My other hobbies, golf and painting, continue. Vivian and I had a great trip to Australia-New Zealand a year ago and plan a Caribbean cruise in early 1992. Please, God, deliver me from my sea-sickness tendency (what a problem for an "admiral"!) We hope to visit with all the alumni including former students and families at the big Geological Centennial bash!

GRADUATE STUDENT RESEARCH

Zulfiqar Ahmad (B.S., Islamia; M.S., Quaid-i-Azam; M.S., London)

Ph.D. dissertation: Numerical groundwater modeling of Rechna Doab, Pakistan.

Supported by AID Pakistan Program.

Advisor: John Thrailkill

Liane B. Alessi (B.S., Arizona)

M.S. thesis: Mineralogical and chemical composition of brecciated clay-carbonate sequences associated with No. 13 coal, western Kentucky: Implications for origin.

Advisor: Sue M. Rimmer

Joseph L. Allen (B.S., Michigan State; M.S., East Carolina)

Ph.D. dissertation: Early Paleozoic synsedimentary tectonics of central Colorado: Interaction of a basement shear zone and pre-Pennsylvanian sedimentation.

Supported by McFarlan Fund; Colorado Scientific Society; and Mobil.

Advisor: William A. Thomas

Jon B. Armstrong (B.S., Kentucky)

M.S. thesis: Characterization of shallow and deep groundwater in the Mississippi embayment in an agricultural setting.

Supported by grant from Kentucky Legislature Senate Bill 271 to College of Agriculture, University of Kentucky.

Advisor: Lyle V.A. Sendlein.

Allen G. Axon (B.S., North Carolina; M.S., Kentucky)

Ph.D. dissertation: Paleontology and paleoecology of a Cincinnati (Maysvillian) crinoid garden.

Advisor: Frank R. Ettensohn

Steve F. Barnett (B.A., Covenant; M.S., Loma Linda)

Ph.D. dissertation: Nature, origin, and age of the Portwood Member of the New Albany Shale in central Kentucky.

Advisor: Frank R. Ettensohn

Reza M. Bayan (Ph.D., Soil Science, Kentucky)

Ph.D. dissertation: The relationships between illite crystallinity and index and metamorphic grades in eastern Kentucky and southwestern Virginia.

Advisor: Nicholas Rast

Michelle R. Bell (B.S., Millersville)

M.S. thesis: The nature of the Martie Line, southwestern Pennsylvania.

Advisor: Nicholas Rast

Denny J. Cantrell (B.S., Kentucky)

M.S. thesis: Organic maturation of the Devonian black shales in eastern Kentucky.

Advisor: Sue M. Rimmer

James F. Coble (M.S., East Carolina)
Ph.D. dissertation: Migmatitic development in the Ocoee Supergroup in western North Carolina.
Advisor: Nicholas Rast

Tony L. Cooley (B.S., Washington [St. Louis])
Ph.D. dissertation: Characterization of the macropore system and water movement through soils and soil/rock interface over a shallow karst conduit system.
Advisor: Lyle V.A. Sendlein

Garland R. Dever (B.S., Notre Dame; M.S., Kentucky)
Ph.D. dissertation: Syntectonic sedimentation in Mississippian carbonates near the Irvine-Paint Creek fault system in the Rome trough, east-central Kentucky.
Advisor: Frank R. Ettensohn

Peter J. Goodman (B.S., Iowa; M.S., Temple)
Ph.D. dissertation: Numerical models of basin analysis in the autochthonous Appalachian basin in Kentucky, Cumberland Plateau region.
Advisor: Nicholas Rast

Stephen F. Greb (B.S., Illinois; M.S., Kentucky)
Ph.D. dissertation: Sedimentology of a Pennsylvanian sandstone from bedding plane exposures, Laurel Dam Spillway, Kentucky.
Advisors: John C. Ferm and Bruce Moore

Steve K. Hampson (B.S., Kentucky)
M.S. thesis: Characterization of shallow groundwater in a limestone terrain in an agricultural setting.
Supported by grant from Kentucky Legislature Senate Bill 271 to College of Agriculture, University of Kentucky.
Advisor: Lyle V.A. Sendlein.

James B. Harris (B.S., Houston; M.S., Kentucky)
Ph.D. dissertation: Site amplifications in the Paducah, Kentucky, area.
Supported by Martin Marietta; Center for Computational Sciences; and the Commonwealth of Kentucky.
Advisor: Ron L. Street

Richard T. Hendricks (B.S., Louisville)
M.S. thesis: Paleontology and paleoenvironments in the Laurel Dolostone, west-central Kentucky.
Advisor: Frank R. Ettensohn

Michael W. Hiatt (B.S., Middle Tennessee)
M.S. thesis: Characterization of groundwater flow and quality of Big Springs, Rutherford County, Tennessee.
Advisor: Lyle V.A. Sendlein

Dennis G. Lewellen (B.S., Oregon State; M.S., Eastern Washington)
Ph.D. dissertation: Control of sedimentation by contemporaneous structure, Pocahontas Formation, Buchanan County, Virginia.
Advisor: John C. Ferm

Yujing Liu (B.S., China; M.S., Auburn)
Ph.D. dissertation: Quantitative analysis of rock type variation, Breathitt Formation, Harlan County, Kentucky
Advisor: John C. Ferm

Michael G. McClure (B.S., Brigham Young)
M.S. thesis: Paleostuctural control upon deposition of Pennsylvanian coal-bearing sequence of the Lee and Norton Formations, Pocahontas basin of southwestern Virginia
Advisor: John C. Ferm

Robin J. McDowell (B.S., Pennsylvania State; M.S., West Virginia)
Ph.D. dissertation: Effects of synsedimentary and pre-thrust basement tectonics on fold-thrust belt geometry, southwestern Montana.
Supported by Chevron; and Petroleum Research Fund of American Chemical Society.
Advisor: William A. Thomas

James A. McHugh (B.S., Kentucky)
M.S. thesis: Geology of the Chilhowee Mountain and vicinity, southeastern Tennessee.
Advisor: Nicholas Rast

Roger J. Paulson (B.S., Wisconsin-Plattville)
M.S. reports: Revision of input and output for Prickett, Naymik, and Lonnquist random walk solute transport modeling program; and Contaminant hydrogeology of a site in Jefferson County, Kentucky.
Advisor: John Thrailkill

Mark W. Scanlon (B.S., Kentucky)
M.S. thesis: Depositional modelling and coal mineability, Upper Freeport seam, northern West Virginia and western Maryland.
Advisor: John C. Ferm

Sohrab E. Shahmir (B.S., Kentucky)

M.S. thesis: Numerical modeling of the groundwater system underlying the Calvert City and Little Cypress Creek Quadrangles, south of the Tennessee River.

Supported by Institute for Mining and Minerals Research; and Kentucky Geological Survey.

Advisor: Lyle V.A. Sendlein

Yalan Tang (B.S., Shanxi; M.S., Wuhan)

Ph.D. dissertation: Coal petrology, mineralogy, and geochemistry of the Fire Clay Coal Bed, southeastern Kentucky

Supported by Medlin Award (Geological Society of America); and McFarlan Fund

Advisors: Sue M. Rimmer and John C. Fern

Charles J. Taylor (B.S., Kentucky)

M.S. thesis: Karst lineaments and their relationship to groundwater occurrence and flow in the Inner Bluegrass Karst Region of central Kentucky.

Advisor: John Thrailkill

Jennifer A. Thompson (B.S., Smith)

Ph.D. dissertation: Organic facies in the Devonian shales, central Kentucky.

Supported by Center for Applied Energy Research.

Advisor: Sue M. Rimmer

Patrick D. Vogler (B.S., Kentucky)

M.S. thesis: Seam morphology and petrography of the Lower Elkhorn coal seam, Martin County, KY

Supported by Mapco Coal Company.

Advisors: Sue M. Rimmer and John C. Fern

Zhenming Wang (B.S., Peking)

M.S. thesis: Q investigations of soil columns in the Jackson Purchase area.

Supported by U.S. Geological Survey; and Kentucky Geological Survey.

Advisor: Ron L. Street

Anna E. Watson (B.S., Kentucky)

M.S. thesis: Stratigraphy and depositional environments of the Pennington Formation, southeastern Kentucky.

Advisor: Frank R. Ettensohn

Edward W. Woolery (B.S., Eastern Kentucky)

M.S. thesis: Site investigations using seismic reflection/refraction data in western Kentucky near New Madrid, Missouri.

Supported by Martin Marietta; and U.S. Geological Survey.

Advisor: Ron L. Street

David R. Wunsch (B.A., Oneonta; M.S., Akron)

Ph.D. dissertation: Groundwater geochemistry and the occurrence of barium and other minor constituents as related to conceptual models of groundwater flow in Eastern Kentucky.

Advisor: John Thrailkill

George B. Wyatt (B.S., Louisville)

M.S. reports: An examination of conclusions contained in the remedial action program for the Hardin County landfill; and The environmental fate of turf pesticides.

Advisor: John Thrailkill

Mei Zhang (B.S., Peking)

M.S. thesis: Site investigations and corrections for the June 10, 1987, southeastern Illinois earthquake particle velocity recordings.

Supported by National Science Foundation; and the Tennessee Valley Authority.

Advisor: Ron L. Street

NEW GRADUATE STUDENTS

John A. Bonita (B.S., Franklin and Marshall)

Diane K. Gremos (B.S., Indiana)

Brian A. Higgins (B.S., Morehead)

Larry D. Hughes (B.S., Western Kentucky)

John C. Mars (B.S., M.S., Alabama)

James M. Montgomery, Jr. (B.S., Montana)

Gordon T. Mullins (B.S., Kentucky)

Jeffrey D. Snell (B.S., South Alabama)

John D. Whitler (B.S., Maryland)

TEACHING ASSISTANTS

Liane B. Alessi

Michelle R. Bell

John A. Bonita

Tony L. Cooley

Brian A. Higgins

John C. Mars

James M. Montgomery, Jr.

Bart C. Schaffer

Jeffrey D. Snell

Yalan Tang

Patrick D. Vogler

John D. Whitler

RESEARCH ASSISTANTS AND FELLOWS

Zulfiqar Ahmad, Agency for International Development
 Joseph L. Allen, National Science Foundation
 Jon B. Armstrong, Commonwealth of Kentucky
 Peter T. Goodmann, Chevron Fellowship
 Steve K. Hampson, Commonwealth of Kentucky
 James B. Harris, UK Computational Sciences and Martin Marietta
 Yuejin Liu, Ark Land Company
 Robin J. McDowell, Petroleum Research Fund
 Shelley A. Minns, Kentucky Department of Surface Mining Reclamation
 Birinder S. Shergill, Eastern Kentucky Power Cooperative
 Jennifer A. Thompson, CAER Organic Petrology Fellowship and Graduate Student Fellowship
 Zhenming Wang, Commonwealth of Kentucky
 Edward W. Woolery, United States Geological Survey

STUDENT AWARDS

Joseph L. Allen, research support (\$600) from McFarlan Fund; research support from Colorado Scientific Society, the Ogden Tweto Fellowship; research support from Mobil

Teresa C. Dowdy, Glen Rice Award (\$250 award for undergraduate research leading to a senior thesis)

Daryl B. Hines, Pirtle Undergraduate Award (\$1000) for a well-rounded junior student who shows commitment to academics and geology as a whole)

Charles T. Hughes, II, Hudnall Award (\$600 award to provide support for summer field camp)

Eric B. Jenkins, Hudnall Award (\$600 award to provide support for summer field camp)

Gary B. Logsdon, Hudnall Award (\$600 award to provide support for summer field camp)

Robin J. McDowell, research support from Chevron

Gordon T. Mullins, Hudnall Award (\$600 award to provide support for summer field camp)

Yalan Tang, Antoinette Liernman Medlin Award, Coal Geology Division, Geological Society of America

STUDENT PRESENTATIONS

Robert M. Baumgartner, Karst surface landforms and their relationship to a karst groundwater basin in Kentucky: Kentucky Water Resources Symposium, Lexington, Kentucky, March, 1991.

Tony L. Cooley, Approaches to hydrogeologic assessment of hydrocarbon contamination in covered karsts with shallow water tables: National Ground Water Association Karst Conference, Nashville, Tennessee, November, 1991.

Shelley A. Minns, Hydrogeology and groundwater monitoring of coal-fired power plant ash disposal site in a karst system: Kentucky Water Resources Symposium, Lexington, Kentucky, March, 1991.

Daniel J. Moore, The delineation of a surficial aquitard in Calvert City, Kentucky, using borehole and electrical resistivity information: Kentucky Water Resources Symposium, Lexington, Kentucky, March, 1991.

Arsin M. Sahba, The effects of coal-fired power plant ash disposal on the groundwater quality of an alluvial system: Kentucky Water Resources Symposium, Lexington, Kentucky, March, 1991; and Geological Society of America Annual Meeting, Dallas, Texas, November, 1990.

Birinder S. Shergill, Factors controlling geochemistry of the Rolling Fork River, Kentucky: Kentucky Water Resources Symposium, Lexington, Kentucky, March 1991.

Yalan Tang, Secondary macropores and mosaic structure in a telemagmatic metamorphic coal and their significance in exploration for natural gas, Henan, China: Society for Organic Petrology Annual Meeting, Lexington, Kentucky, September 1991.

Jennifer A. Thompson, Organic facies in Devonian shales of central Kentucky: Preliminary results: Eastern Oil Shale Symposium, Lexington, Kentucky, November 1991.

FACULTY RESEARCH SUPPORT

U.S. Bureau of Mines (IMMR), "Feasibility study for producing a photographic core-logging manual for the Devonian-Mississippian oil and gas shales of Kentucky," Frank R. Ethensohn.

Ark Land Company, "Stratigraphic variability in the lower part of the Breathitt Formation," John C. Ferm.

Royal Dutch Shell, "Morphology of fluid sandstones in the Breathitt Formation," John C. Ferm.

Island Creek Coal Company, "Lateral variability in coal seams in eastern Kentucky," John C. Ferm.

Shell Development Company, "Effects of overpressure on organic maturation parameters," Sue M. Rimmer.

University of Windsor, "Clay mineral analysis of bottom sediments, Gulf of St. Lawrence," Sue M. Rimmer.

U.S. Geological Survey, "Site amplification of strong ground motions at Paducah, Kentucky," Ron L. Street.

Martin Marietta Energy Systems, "Far-field ground motions study at Paducah Gaseous Diffusion Plant," Ron L. Street.

Commonwealth of Kentucky, "Upgrading of the Kentucky Digital Seismic and Strong-Motion Networks," Ron L. Street.

Department of Transportation, "Seismic analysis of the Brent-Spence Bridge," Ron L. Street.

Tennessee Valley Authority, "Seismic monitoring," Ron L. Street.

National Science Foundation, "The role of lateral (cross-strike) connectors in fold-thrust belts," William A. Thomas.

Petroleum Research Fund of American Chemical Society, "Controls on locations of lateral ramps in fold-thrust belts," William A. Thomas.

North Queensland Energy Company, "Microfracture control of methane gas production from coal," Bruce Moore.

Eastern Kentucky Power Cooperative, Inc., "Utility solid waste study: Field study of leaching characteristics at a flue-gas desulfurization sludge/ash disposal site," Lyle V.A. Sendlein and James Dinger.

Kentucky Department of Surface Mining and Reclamation, "Hydrologic impact of below drainage underground mining in Kentucky," James Dinger and Lyle V.A. Sendlein.

Kentucky Legislature (Senate Bill 271), College of Agriculture, University of Kentucky, "Groundwater research on potential impacts of agricultural practices," Lyle V.A. Sendlein.

PUBLICATIONS

UK faculty

UK graduate student or former student

R. Baumgartner, graduate student

Baumgartner, R., and Sendlein, L.V.A., 1991, Karst surface landforms and their relationship to a karst groundwater basin in Kentucky: Proceedings, Kentucky Water Resources Symposium, Lexington, Kentucky.

M.R. Burn and A.H. Davies, post-doctoral associates

Burn, M.R., and Davies, A.H., 1991, Valley fills of the Upper Carboniferous, Breathitt group, east Kentucky: a high resolution sequence stratigraphic analysis of fluvial channel stacking patterns and fluviodeltaic cyclothems. Abstract, Annual Meeting of the British Sedimentological Research Group, Edinburgh.

J.A. Drahovzal, adjunct faculty

Drahovzal, J.A., 1990, The Kentucky-Ohio trough and its relationship to Precambrian and Cambrian basins in the eastern United States: 21st Annual Appalachian Petroleum Geology Symposium Publication 2, p. 11-12.

Drahovzal, J.A., 1990, Precambrian and Cambrian basins in eastern North America [abs.]: 54th Annual Kentucky Oil and Gas Association Meeting, Abstracts.

Drahovzal, J.A., Wickstrom, L.H. and Keith, B.D., 1990, The Kentucky-Ohio trough and its relationship to basins in the eastern United States: Geological Society of America, Abstracts with Programs, v. 22, no. 7, p. A230-231.

Hamilton-Smith, T., Nuttall, B.C., Gooding, P.J., Walker, D., and **Drahovzal, J.A.**, 1990, High-volume oil discovery in Clinton County Kentucky: Kentucky Geological Survey, Information Circular 33, 13 p.

see **Thomas, W.A.**, and **Drahovzal, J.A.**, 1990.

F.R. Ettensohn

Norby, R.D., Shaw, T.H., **Ettensohn, F.R.**, and **Goodmann, P.T.**, 1990, Biostratigraphy of the New Albany Shale (Devonian-Mississippian) in the west-central Kentucky area: Geological Society of America Abstracts with Programs, v. 21, no. 4, p. 43.

Ettensohn, F.R., 1990, The Mississippian System in the Appalachian basin: a flexural relaxation response following the Acadian orogeny: Geological Society of America Abstracts with Programs, v. 22, p. 13.

Ettensohn, F.R., 1990, Carbonate paleosols and paleoclimatic indicators: Examples from the Slade Formation (Upper Mississippian), eastern Kentucky: Geological Society of America Abstracts with Programs, v. 22, p. A333.

Ettensohn, F.R., 1990, Estimating absolute depths for Devonian-Mississippian black shales in eastern United States: Implications for eustatic vs. tectonic control of sea level: Appalachian Basin Industrial Associates, Fall Program, West Virginia University, Morgantown, v. 17, p. 40-139.

Ettensohn, F.R., **Barnett, S.F.**, and Norby, R.D., 1990, Middle Devonian black shales in Kentucky: Proceedings, 1990 Eastern Oil Shale Symposium, University of Kentucky Institute for Mining and Minerals Research, Lexington, p. 218-226.

Ettensohn, F.R., 1991, Sponge-trilobite relationships inferred from sponge-derived, soft-sediment trace

fossils: Geological Society of America Abstracts with Programs, v. 23, p. 27.

Ettensohn, F.R., 1991, Review of "Argillaceous rock atlas," by N.R. O'Brien and R.M. Slatt: Economic Geology, v. 86, p. 904.

Ettensohn, F.R., 1991, Appalachian unconformities reflecting orogenic events: Geological Society of America Abstracts with Programs, v. 23, p. 26.

Ettensohn, F.R., 1991, Tectonic, paleoclimatic and paleogeographic controls on Paleozoic epicontinental black-shale deposition, Appalachian basin, U.S.A.: Abstracts, International Symposium, Black-shale basins and related mineral deposits, Novosibirsk, v. 1, p. 204.

Pashin, J.C., and **Ettensohn, F.R.**, 1991, Availability of nutrients and habitable substrates in the dysaerobic zone: The Bedford fauna (Devonian) of Ohio and northeastern Kentucky: Geological Society of America Abstracts with Programs, v. 23, p. 113.

see **Watson, A.E.**, and **Ettensohn, F.R.**, 1991.

Ettensohn, F.R., 1991, Critical factors in the origin of Kentucky's Devonian-Mississippian oil and gas shales: Highlights, v. 10, no. 4, p. 1-2.

Ettensohn, F.R., 1991, Flexural interpretation of relationships between Ordovician tectonism and stratigraphic sequences, central and southern Appalachians, U.S.A., in Advances in Ordovician geology: Geological Survey of Canada Paper 90-9, p. 213-224.

Pashin, J.C., and **Ettensohn, F.R.**, in press, The Bedford fauna (Late Devonian) of Ohio and Kentucky (U.S.A.): Paleoecologic and sedimentologic dynamics of the dysaerobic zone: Paleogeography, Paleoclimatology, Paleoecology.

Ettensohn, F.R., in press, Fossils of Kentucky: The Kentucky Encyclopedia, Lexington, Kentucky.

Ettensohn, F.R., in press, Possible flexural controls on the origins of extensive, ooid-rich, carbonate environments in the Mississippian of the United States, in Zuppan, C.W., and Keith, B., Mississippian oolites of North America: American Association of Petroleum Geologists Studies in Geology.

Ettensohn, F.R., and Chesnut, D.R., in press, Nature and probable origin of the Mississippian-Pennsylvanian unconformity in the eastern United States: *Compte Rendu, Eleventh International Congress of Carboniferous Stratigraphy and Geology*, Beijing, 19 p.

Ettensohn, F.R., 1991, Controls on the origin of Devonian-Mississippian oil and gas shales, east-central United States: Abstracts, 1991 Eastern Oil Shale Symposium, University of Kentucky Institute for Mining and Minerals Research and Center for Applied Energy Research, Lexington, p. 67.

J.C. Ferm

Ferm, J.C., and Weisenfluh, G.A., 1991, Cored rocks in the southern Appalachian coal fields: Department of Geological Sciences, University of Kentucky, Lexington, Kentucky.

Moore, T.A., Ferm, J.C., and Weisenfluh, G.A., 1991, Guide to Eocene-coal types in Kalimantan Sela Fm., Indonesia: Department of Geological Sciences, University of Kentucky, Lexington, Kentucky.

Moore, T.A., Ferm, J.C., in press, Composition and grain size of an Eocene age coal bed in southeastern Kalimantan (Borneo), Indonesia: *International Journal of Coal Geology*.

see **Weisenfluh, G.A., and Ferm, J.C.**, 1991.

Ferm, J.C., 1990, Three dimensional geometries and thickness of reservoir sand bodies - Example from the carboniferous of Kentucky: *Gulf Coast Association of Geological Societies Transactions*, v. 40, p. 195-200.

P.T. Goodman, graduate student

Goodmann, P.T., 1988, Stratigraphy and basin dynamics of the upper Tonoloway and Keyser formations, (upper Silurian - lower Devonian) of central Pennsylvania: *Northeastern Geology*, v. 10, no. 3, pp. 231-240.

Goodmann, P.T., 1989, Stratigraphy and basin dynamics, upper Tonoloway and Keyser formations (upper Silurian-lower Devonian), central Pennsylvania: An episodic perspective [abs.]: *Kentucky Academy of Sciences*, v. 50 (1-2), p. 120.

see **Norby, R.D., Shaw, T.H., Ettensohn, F.R., and Goodmann, P.T.**, 1990.

A. Haak, graduate student

Haak, A., and O'Hara, K., 1990, Fluid/rock interaction on the Rector Branch thrust, North Carolina, western Blue Ridge province: *Geological Society of America Abstracts with Programs*, v. 22, p. 16.

see **O'Hara, K., and Haak, A.**, in press.

J.B. Harris, graduate student

Harris, J.B., and Street, R., 1989, Morphology of a sub-Pennsylvanian paleochannel using common-offset seismic data: *Society of Exploration Geophysicists Fifty-Ninth Annual International Meeting, Expanded Abstracts*, v. 1, p. 457-459.

Harris, J.B., Jones, D., and Street, R., 1991, A shallow seismic refraction study of the Versailles cryptoexplosion structure, central Kentucky: *Meteoritics*, v. 26, p. 47-53.

Harris, J.B., and Street, R., 1991, Integrated seismic site characterization of the Paducah, Kentucky, area: Preliminary results, *Proceedings of the Symposium on the Application of Geophysics to Engineering and Environmental Problems*, Knoxville, Tennessee, p. 24-38.

see **Street, R., Harris, J.B., and Zekulin, A.**, 1990.

see **Street, R., Zekulin, A., and Harris, J.B.**, 1991.

see **Street, R., Taylor, K., Jones, D., Harris, J.B., Steiner, G., Zekulin, A., and Zhang, M.**, in press.

see **Zhang, M., Street, R., and Harris, M.B.**, 1991.

J.C. Hower, adjunct faculty

Hower, J.C., Rich, F.J., Williams, D.A., Bland, A.E., and Fiene, F.L., 1990, Cretaceous and Eocene lignites, Jackson Purchase, Kentucky: *International Journal of Coal Geology*, v. 16, p. 239-254.

Hower, J.C., Esterle, J.S., Wild, G.D., and Pollock, J.D., 1990, Perspectives on coal lithotype analysis: *Journal of Coal Quality*, v. 9, p. 48-52.

Hower, J.C., Rimmer, S.M., Williams, D.A., and Beard, J.G., 1990, Coal rank trends in the Western Kentucky coalfield and relationship to hydrocarbon occurrence, in **Nuccio, V.T., and Barker, C.E.**, ed.,

Applications of thermal maturity studies to energy exploration: Rocky Mountain Section, Society of Economic Paleontologists and Mineralogists, p. 127-138.

Lewis, S.E., and **Hower, J.C.**, 1990, Thermal events and thrust emplacement sequence in the Appalachian fold and thrust belt: Some new vitrinite reflectance data: *Journal of Geology*, v. 98, p. 927-942.

Lloyd, W.G., Reasoner, J.W., **Hower, J.C.**, and Yates, L.P., 1990, Estimates of fluid properties of high volatile bituminous coals: *Fuel*, v. 69, p. 1257-1270.

Hower, J.C., Wild, G.D., Pollock, J.D., Trinkle, E.J., Bland, A.E., and Fiene, F.L., 1990, Petrography, geochemistry and mineralogy of the Springfield (Western Kentucky No. 9) coal bed: *Journal of Coal Quality*, v. 9, p. 90-100.

Griswold, T.B., **Hower, J.C.**, and Cobb, J.C., 1990, Impact of coal quality variations on utilization of the Springfield (Western Kentucky No. 9) coal bed: *Journal of Coal Quality*, v. 9, p. 113-119.

Hower, J.C., 1990, Applications of microlithotype nomenclature in ultra-fine coal processing: *The Society for Organic Petrology Newsletter*, v. 7, no. 1, p. 7-8.

Taulbee, D.N., **Hower, J.C.**, and **Rimmer, S.M.**, 1990, DGC separation of non-demineralized coals: Preliminary studies: American Chemical Society, Great Lakes Section Regional Meeting.

Hower, J.C., 1990, Review of "Organic petrography and organic geochemistry of Texas Tertiary coals in relation to depositional environment and hydrocarbon generation," by Prasanta K. Mukhopadhyaya: *Organic Geochemistry*, v. 15, p. 465.

Williams, D.A., Helfrich, C.T., **Hower, J.C.**, Fiene, F.L., Bland, A.E., and Koppenaal, D.W., 1990, Amos and Foster coals: Low-ash and low-sulfur coals of western Kentucky: Kentucky Geological Survey, Series XI, Report of Investigations 5, 34 pp.

Hower, J.C., 1990, Hardgrove grindability index and petrology used as an enhanced predictor of coal feed rate: *Energie*, v. 1, no. 6, p. 1-2.

Hatton, A.R., **Hower, J.C.**, Helfrich, C.T., Pollock, J.D., and Wild, G.D., 1990, Petrography, geochemistry, and palynology of the Path Fork coal

bed, southeastern Kentucky: Abstracts and Program, The Society for Organic Petrology, 7th Annual Meeting, Calgary, Alberta, Sept. 9-14, 1990, p. 41-43.

Hower, J.C., and Fishel, K.W., 1990, Anisotropy of coal reflectance: example from no. 5 seam ("Bollas") meta-anthracite, Peru: *The Society for Organic Petrology Newsletter*, v. 7, no. 3, p. 10-11.

see **O'Hara, K.**, **Hower, J.C.**, and **Rimmer, S.M.**, 1990.

Helfrich, C.T., and **Hower, J.C.**, 1991, Palynologic and petrographic variation in the Pond Creek coal bed, Pike County, Kentucky: *Organic Geochemistry*, v. 17, p. 153-159.

Hower, J.C., and **Rimmer, S.M.**, 1991, Coal rank trends in the central Appalachian coal field: Virginia, W. Virginia, and Kentucky: *Organic Geochemistry*, v. 17, p. 161-173.

Esterle, J.S., **Moore, T.A.**, and **Hower, J.C.**, 1991, A reflected-light petrographic technique for coarse-grained woody peats: *Journal of Sedimentary Petrology*, v. 61, p. 614-616.

Hower, J.C., **Rimmer, S.M.**, and Bland, A.E., 1991, Geochemistry of the Blue Gem coal bed, Knox County, Kentucky: *International Journal of Coal Geology*, v. 18, p. 211-231.

Raione, R.P., **Hower, J.C.**, and Wild, G.D., 1991, Influence of regional structure on the development and quality of the Upper Elkhorn No. 2 coal bed, eastern Kentucky: *International Journal of Coal Geology*, v. 18, p. 305-325.

Hower, J.C., and Parekh, B.K., in press, Chemical/physical properties and marketing, in J.W. Leonard, Coal preparation, 5th ed.: American Institute for Mining Engineering, chapter 1, p. 94.

Hower, J.C., Trinkle, E.J., Pollock, J.D., and Helfrich, C.T., in press, Influence of penecontemporaneous tectonism on thickness and quality of Breathitt Formation coals, eastern Kentucky, in S. Suboleski, One point two - New geologic perspectives on Central Appalachian low-sulfur coal supply: Coal Decisions Forum.

Griswold, T.B., and **Hower, J.C.**, in press, A discussion of coal quality considerations relative to the utilization of low sulfur coal in the Appalachian region of Kentucky: examples from the Pond Creek

and Upper Elkhorn No. 3 coal beds, in S. Suboleski, One point two - New geologic perspectives on Central Appalachian low-sulfur coal supply: Coal Decisions Forum.

Hower, J.C., Pollock, J.D., and Griswold, T.B., in press, Structural controls on petrology and geochemistry of the Pond Creek coal bed, Pike and Martin Counties, eastern Kentucky, in D.C. Peters, ed., Geology in coal resource utilization: American Association of Petroleum Geologists, Energy Minerals Division.

Taulbee, D.N., Hower, J.C., and Greb, S.F., 1991, Examination of micrinite concentrates from the Cannel City coal bed of eastern Kentucky: Proposed mechanism of formation: Organic Geochemistry, v. 17, p. 557-565.

Hower, J.C., Keogh, R.A., and Taulbee, D.N., 1991, Petrology of liquefaction residues: Maceral concentrates from a Pond Creek durain, eastern Kentucky: Organic Geochemistry, v. 17, p. 431-438.

de Wet, C.B., Moshier, S.O., Hower, J.C., and Rimmer, S.M., 1991, Deposition and diagenesis of a marine-swamp margin: The Providence Limestone and adjacent coals, western Kentucky, in A.J. Lomando and P.M. Harris, eds., Mixed carbonate-siliciclastic sequences: Society of Economic Paleontologists and Mineralogists Core Workshop No. 15, p. 169-204.

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N. Rast

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L.V.A. Sendlein

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G.A. Weisenfluh, research associate

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M. Zhang, graduate student

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DEPARTMENTAL SEMINARS 1990-1991

Alfred Lacazette - Pennsylvania State University
Coupled deformational and pore pressure history of the Bald Eagle Sandstone in central Pennsylvania: The development of a fractured gas reservoir.

David Lawrence - AAPG Distinguished Lecturer
Stratigraphic modeling of sedimentary basins.

Baofang Li - Chinese University, Beijing, PRC
Teaching and research in China.

Roy Kepferle - Eastern Kentucky University
Significance of geologic mapping in the Mississippian of Kentucky.

Rick Williams - University of Tennessee
Appalachian geophysical transect.

Kees DeJong - University of Cincinnati
Tectonics of northern Mexico.

Terry Hamilton-Smith - Kentucky Geological Survey
Acadian orogeny in the autochthonous Appalachian basin.

Susan DeBari - Arizona State University
Magmatism in arcs: What happens in the deep crust?

Charles Kerans - University of Texas
Quantitative characterization of carbonate reservoirs.

Gray Bebout - Carnegie Institution of Washington
Fluids in subduction zones.

Charlotte Allen - University of Kentucky
Two stage mixing processes in plutons.

David Moecher - State University of New York
The nature of fluid phase in metamorphic rocks.

William Brown - Baylor University
Structural and tectonic models in the western United States.

DEPARTMENTAL FUNDS

The state budget provides for the necessary expenses of operating the instructional programs of the department, at least on a minimum basis. Thanks to continuing generous contributions, the Department of Geological Sciences has several special funds that enable us to significantly enhance the programs that we offer. These special funds are administered by the departmental Awards Committee, and most of these funds provide scholarships for undergraduate and graduate students. Of particular importance, the special funds support participation in summer field camp, undergraduate research, and graduate research for a thesis or dissertation. We also are able to assist graduate students in attending meetings to present papers. The department seminar program, including invited speakers from other institutions, is a most important enhancement of our graduate program; and our special funds supplement resources provided by the College of Arts and Sciences for this program. The opportunity to obtain needed instructional equipment is especially important. For example, we have obtained University funds for the renovation of a large lecture room (Funkhouser 200) for our University Studies courses. To maximize the utility of that room, we need additional projection equipment, an additional screen, new video programs, and wall maps. We will make every effort to obtain these through University funds, but realistically, we will also need your support of our special funds to completely realize our goals. In short, our special funds enable us to go from a fairly standard level to one that provides much better programs for our students.

Several of our special funds operate wholly from contributions. These funds and the designated uses are:

McFarlan Fund

- student research grants; student prepares proposal including itemized budget (maximum award \$600)
- student travel to professional meetings to present papers

Geology Development Fund

- enhancement of departmental programs in teaching and research

Geology Support Fund

- support of the departmental seminar program
- equipment for enhancement of instruction

Geology Museum Fund

- operation of the Hudnall Geological Sciences Museum

Glenn Rice Memorial Fund

- undergraduate research grants, to support senior theses (maximum award \$500)

Wallace W. Hagan Scholarship Fund (new fund)

- undergraduate scholarship, for a student in field-oriented geology

In addition to the funds supported by alumni contributions, the Department of Geological Sciences has other funds supported by endowments from alumni and annual corporate contributions. These funds and the purposes are:

Hudnall Scholarship Fund

(endowed by James S. Hudnall)

- scholarships for participation in summer field course

Pirtle Scholarship Fund

(endowed by George W. Pirtle)

- undergraduate scholarship for outstanding junior (\$1,000 per year)
- graduate scholarship (approximately \$11,000 per year plus tuition)

Chevron Fellowship (funded annually)

- graduate fellowship (approximately \$8,300 per year plus tuition)

Chevron Support Fund (funded annually)

- support for student research
- equipment for instruction and/or research

Mobil Support Fund (funded annually)

- support for student research
- equipment for instruction and/or research

Our contributed funds depend almost entirely on our alumni. In other words, the continued support of our current students depends on the generosity of our former students. Many of our alumni will recall the support, direct (for example, field expenses) or indirect (for example, better instructional equipment), that they received while students at UK. Please

consider making a gift to one of the departmental funds. If you have helped us in the past, we encourage you to continue, and if you have not, this is a good time to begin. Enclosed is a separate sheet designed so that your gift may be directed to the fund and purpose of your choice. The resources provided by these funds are essential to the continued quality of our programs. Thank you for your support!

RECENT CONTRIBUTORS TO DEPARTMENTAL FUNDS

McFarlan Fund

Edward M. Self (Panhandle Eastern matching)
David H. Yates
Sam H. Stith (ARCO matching)
Michael W. Bourque (Shell matching)
Jo C. Napier
Katherine C. Manger
Phillip H. Manger

Geology Support Fund

overriding royalty on a well contributed by Donald R. Townsend

Geology Development Fund

Noel W. Engel

Chevron Support Fund

Chevron

Chevron Fellowship

Chevron

ALUMNI NEWS

ALUMNI MEETINGS

At the 1991 AAPG meeting in Dallas, we initiated a "new tradition." An address book will now be available at the alumni functions at various geological meetings. Please come by the Kentucky standard and sign in.

Signing in at Dallas AAPG were Don Haney, Clem Bruce, Bill and Vivian MacQuown, Jim Cobb, Jim

Lewis, Russell and Carolyn Ford, Louis Ford, Phil and Kathy Manger, Steve Moshier, Lowell King, Dan Phelps, Terence O'Hare, Jack Pashin, Don Blancher, and Bill Thomas.

At the 1991 GSA meeting in San Diego, we saw the following: Lavon Lewis, Kevin Pogue, Norm Hester, Don Haney, and Bill Thomas.

"The Book" will be attending future meetings, so please come by on alumni party night.

HONORED ALUMNI

Lou Ford, B.S. 1951, M.S. 1956, has been honored by the Oklahoma City Geological Society. He is now an Honorary Life Member.

Bobby J. Timmons, B.S. 1962, with Timmons Associates, Consulting Geologists, in Jacksonville Beach, Florida, was honored by Rock Products Magazine for outstanding contributions to the industry he serves. He was described as "a geologist who actively works to sway negative public attitude about the mining industry."

NEWS ITEMS

Scott Dillman, B.S. 1980, is a geologist with Engineering Science, Inc., in Liverpool, New York.

George Fugate, Jr., M.S. 1956, a petroleum consultant at Howey-in-the-Hills, Florida, took a trip last summer through the area around Gunnison, Colorado.

Jim Hazel, B.S. 1973, is now with the Oil and Gas Division of the Kentucky Department of Mines and Minerals in Owensboro.

Frank McGilvary, B.S. 1960, is with Alyeska Pipeline Service Company in Fairbanks.

Patricia Wonderley Stanford, B.S. 1979, M.S. 1982, is an attorney with Vinson and Elkins in Houston.

G.W. Velotta, B.S. 1946, continues in the oil business and consulting in Oklahoma City.

Recent visitors to the Department included: Jack Carrington, B.S. 1958; Fred Flege, B.S. 1950, M.S. 1952; Harry Whitman, B.S. 1958; Harvey Young, B.S. 1955.