

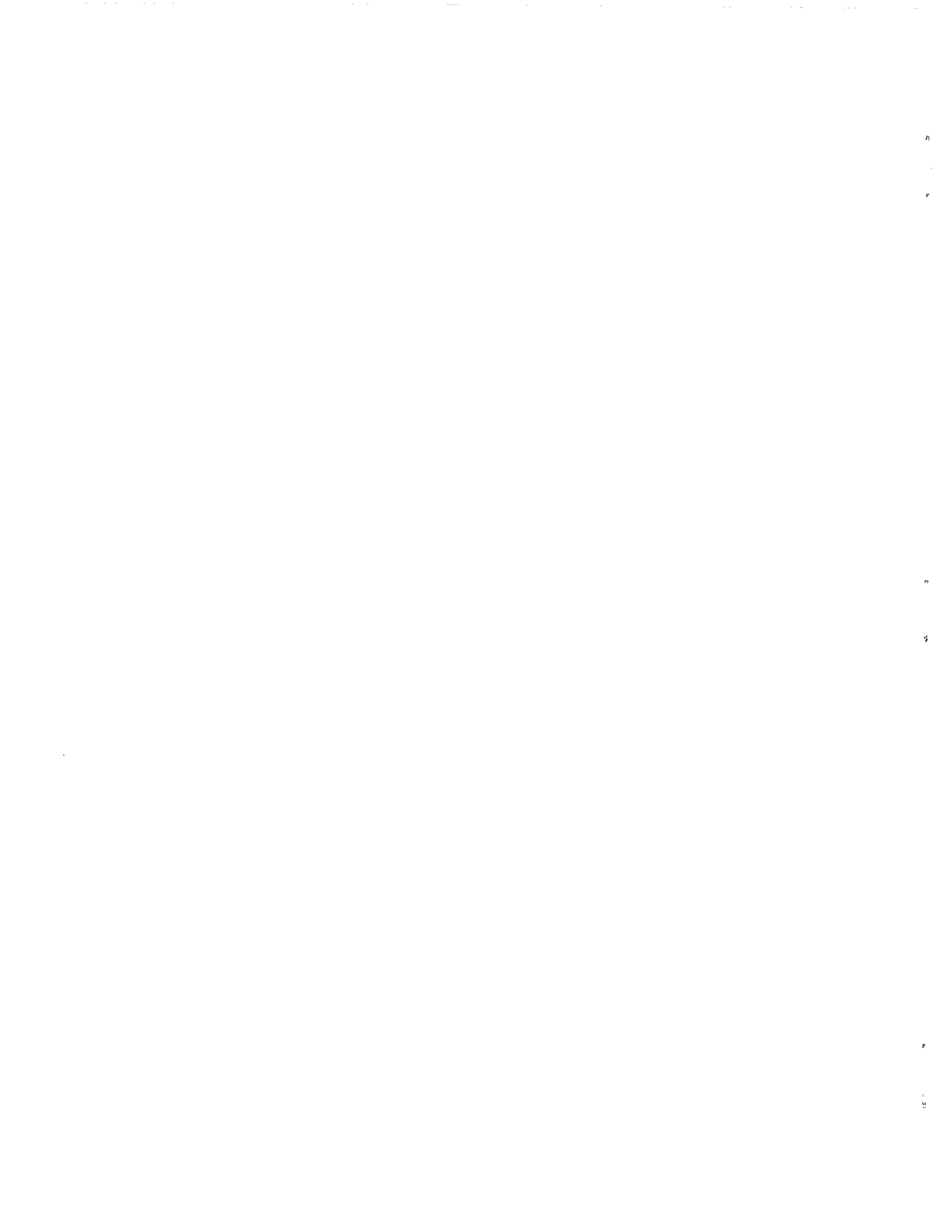
# ROUND UP

1990



Slone Building

**Department of Geological Sciences  
University of Kentucky  
Lexington, Kentucky**



# DIRECTORY

Department of Geological Sciences  
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Richard I. Barnhisel\*  
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## Adjunct Professor

James C. Cobb  
James S. Dinger  
Donald C. Haney  
James C. Hower

## Associate Professor

Bruce Moore  
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## Emeritus

William R. Brown  
Lois J. Campbell  
William H. Dennen  
Irving S. Fisher  
Erwin J. Lyons  
William C. MacQuown  
Thomas G. Roberts  
Frederick D. Wright

## Assistant Professor

Stephen O. Moshier  
Kieran D. O'Hara

\* Joint with Agronomy

Enrollments at the undergraduate level have steadily declined since 1982 to a low of 23 majors last year, but it seems as though we have bottomed out and a slight rise has occurred this year to 33. The smaller numbers have made our teaching loads easier but does not enhance our position within the University system.

Graduate enrollments are holding steady at about 45 with a significant increase in the number of students interested in hydrogeology.

A new scholarship program honoring Wallace Hagan (former State Geologist and director of The Kentucky Geological Survey) has been established in the Department by his brother General Richard Hagan, Ret. The purpose of the fund is to support undergraduate students.

The Department has partially moved into the Slone Building and plans are to complete the move in 1991 or '92. Additional space has been obtained for the coal group of John Fenn and the new microprobe in the Mining and Mineral Resources Building. More on this in a later section of this issue.

The faculty have been extremely active and their publications since 1982 are included for you along with some comments from them. A very active seminar program has been in place these past eight years with off campus speakers sponsored the AAPG, GSA, National Water Well Association, the University and the Department.

As part of standard administrative procedures, the Department underwent a review by internal and external committees. As with all such procedures we learned a lot about ourselves and, while we found places for improvement, we were pleased for the overall positive review.

Major contract and grant support has come from the American Chemical Society; Appalachian Basin Industrial Association; BPH Utah; U.S. Bureau of Mines; Department of Interior; Chevron U.S.A., Incorporated; Department of Military Affairs; Division of Water; Department of Natural Resources and Environmental Protection of Kentucky; Eastern Kentucky Power Cooperative; Island Creek Coal Co.; Kentucky Geological Survey; Mobil Oil; National Science Foundation; Office of Water Policy; Department of Interior; Straight Creek Resources; U.S. Environmental Protection Agency; U.S. Geological Survey; and the U.S. Nuclear Regulatory Commission.

A strong working relationship has been developed by several faculty members with the Kentucky Geological Survey, The Center for Applied Energy Research (Iron Works Pike Laboratory) and the Institute for Mining and Minerals Research.

Chevron Oil has supported a fellowship in the Department, and Mobil also provides support for departmental activities. This support is much appreciated, especially in this difficult time.

We don't hear from you often enough. Should you like to drop us a line and tell us about your activities, please use the last page of The Round Up to jot few lines and send it to us. We will store your note for the next issue.

Lyle V.A. Sendlein  
Acting Chairman



## DEPARTMENTAL NEWS

### *Chairman Position*

Nick Rast stepped down at the end of June 1989 after serving the Department for eight years as Chairman. Lyle Sendlein assumed the Acting Chairman's position in July of 1989 and will serve through the end of December, in 1990.

A search for a new Chairman was started in the summer of 1989 and in July of 1990 William A. Thomas accepted the position. Bill will come to UK in December, 1990 to assume the leadership of the Department.

Known internationally as an ardent researcher and geology scholar, William A. Thomas has been selected as the next Chairman of the Department of Geological Sciences. He will come to the department from the University of Alabama at Tuscaloosa, Alabama. He has received a Ph.D. from Virginia Polytechnic Institute in 1960, and the bachelor's and master's degrees from the University of Kentucky in 1956 and 1957 respectively. He began his professional career in 1959 as a geologist for The California Company (now known as Chevron). Bill also served as Chairman of the Department of Geology at Georgia State University from 1972-79 before going to the University of Alabama. Prior to his Georgia appointment, he had taught at Queens College of City University of New York and at Birmingham-Southern College. He recently retired as editor of the Geological Survey of America Bulletin.

Bill has received external research funding from the National Science Foundation, the American Chemical Society, the U.S. Department of Energy, Conoco Inc., and other corporate contributors. These funds have helped support more than 15 graduate students over the last five years.

Bill has published extensively in leading journals of the geological sciences. He has prepared several articles by invitation for publication in special volumes such as the Geological Society of America Decade of North American Geology Series, the Annual Review of Earth and Planetary Sciences, and the Geological Society of London Memoir Series.

We are fortunate to have Bill as our next Chairman and look forward to a very creative and productive period in the history of the Department.





## ***Slone Building***

Some of you may remember the Slone Building as the home of the Pharmacy program at UK. It soon will become the home of the Department. The building, which is located on Washington Avenue just down from Bowman Hall, has approximately 25,000 square feet of usable space on three floors.

The Department has already moved into the third floor with the seismic research facilities of Ron Street being consolidated into one area. Bruce Moore has also moved his research laboratory and office to the third floor. All graduate students have been moved to the third floor as well or to space in Research I, which is adjacent to the Slone Building.

Renovation of the second floor is beginning this year and some modification to rooms on the third and first floor will be completed a year from now. Plans are to move everything into Slone except the library and the museum. Although the move means disruption, the new space will be a great improvement in our teaching and research facilities.

We would like to make our new building attractive and educational, and plan to purchase maps and construct displays for hall ways and lecture rooms. We encourage contributions to the department of either outstanding geological specimens or donations to a fund set aside for this specific purpose.

## ***Mining and Mineral Resources Building***

This new building on Rose street across from Chem/Physics and next to the New Faculty Club was completed two years ago. The building houses the Kentucky Geological Survey, the Mining Engineering Department, The Institute for Mining and Minerals Research and two Department of Geological Science groups. The coal geology group of John Ferm is located on the second floor with a large research laboratory in the basement. The second group includes the laboratory dedicated to the new microprobe.

## ***Scholarship Funds and Alumni Support***

All of you at one time were students at the University of Kentucky, and many of you probably received some sort of financial aid in addition to that which you may have received as a teaching assistant. You may remember money from

one of these funds helped to pay your way to a scientific meeting or helped to defray field expenses, or helped to pay for some special need for your thesis completion.

The Department continues to support undergraduate and graduate students with special needs from the McFarlan Fund, the Glenn Rice Fund, and the U.K. Geology Support Fund, and now the new Wallace C. Hagan Fund.

These funds operate wholly from contributions which you make. In each fund, contributions are put into an endowment and the interest is used to support student needs. However, inflation continues to erode the value of the endowments, and truthfully, we in the Department have not been very active in soliciting new contributions. Nonetheless, the funds continue to be used heavily, and we need to build up the endowments to keep pace with inflation and increased needs.

If you have helped out in the past, we would like to encourage you to continue, and if you have not, now is a good time to begin! Any contribution, no matter how small, will be greatly appreciated. You may specify, if you wish, to which fund you wish your contribution to go. The Glenn Rice Fund is used by the Department to support undergraduate research, whereas the McFarlan Fund is used to support travel, minor equipment, and special research needs for both graduate and undergraduate students. A new scholarship fund, the Wallace W. Hagan Scholarship Fund, USAF (Ret.) within the Department to support a senior undergraduate student who shows an interest in field oriented geology. The U.K. Geology Support Fund is an all-purpose fund for both student and faculty needs. The Glenn Rice and U.K. Geology Support funds are small funds and usually make awards under \$200, whereas the McFarlan Fund is a large fund and makes many awards in the \$300 range. These amounts may seem small by current standards, but many students have found them very helpful in finishing their thesis research.

The guidelines for usage of these funds have recently been reviewed and updated, and the funds are administered by an Awards Committee in the Department. If you have any questions, please contact the Department, and remember any contribution will be appreciated.

## FACULTY AND RESEARCH STAFF NEWS

### *Charlotte Allen*

Hello. I joined the department in August 1989 after 10 years of moving around -- New Jersey, Oregon, California and Virginia. As the fates would have it, I am a Louisville native and thus the path has come nearly full circle.

I have been interested in igneous petrology since I was an undergraduate at Princeton University. From there I went to the University of Oregon to pursue that interest. After a Master's degree, I worked as a geologist for the U.S. Geological Survey in Menlo Park for two years, selected a dissertation project and enrolled at Virginia Tech where I finished a year ago. My past research has included field, petrologic, and isotope geochemical studies of plutons in the Klamath Mts. and Mojave Desert of California. Presently I am publishing those results and have begun research proposals to study the basement rocks of Eastern Kentucky from drill chips (in cooperation with the Kentucky Geological Survey), the petrogenesis of alkaline plutons in the Piedmont and Blue Ridge of North Carolina, Virginia, and Tennessee (with N. Rast and S. Farrar at E.K.U.), and geochemical changes associated with ductile deformation of granites (mylonites) in the Mojave Desert (this study with K. O'Hara).

I teach the year long mineralogy sequence to undergraduates and hope to more fully incorporate experience with analytical equipment (XRF and electron microprobe). I also teach the undergraduate igneous and metamorphic courses. These courses include field trips to the Blue Ridge so that some field experience is an integral.

### *William R. Brown*

My last bit of teaching before retirement in 1984 was in Colorado field camp. It was great to get back into that wonderful country. The geology is the same, but much else has changed with the big ski resort just north of the Butte and the many new homes and condos along the river.

Since retirement I have had some fine trips with the family. These included a New England cruise and trips to Alaska, the Canadian Rockies, Australia, and New Zealand. Geologically, I continued study of the Shores Melange, a possible subduction complex in the central Virginia Piedmont, and published a squib concerning it in GSA's volume on critical geologic sites in the Southeast. In 1989 I was an adjunct leader in the Virginia Piedmont field trip of the International

Geologic Congress. We had a most interesting group of 17 people on the trip, exclusive of the leaders, from 12 different countries.

Aside from these activities, and finding a million things to do at home, I have spent a good bit of time at the Geology Department, been to a few meetings, played a lot of tennis, biked a good bit, and taken two ski trips to Colorado or New Mexico each winter.

## ***Lois Campbell***

As I write this I can say I officially retired (May 15). When my colleagues checked up on dates, it turned out I had been teaching geology at UK for 36 years.

The retirement has entailed a number of things: some very pleasant, some not so pleasant. Among the former was a surprise (almost) reception in the Pirtle Library of Geological Sciences attended by students and colleagues in the Department and from across campus. As if that wasn't enough the Department also treated me to a dinner at a local restaurant, and there presented me with a plaque (noting the 36 years), a book, a scrapbook of letters from friends and former students and a nice fat check for travel. For these gifts I have not only to thank the departmental faculty and present students, but also many of you alumni/ae and friends. The not so very pleasant aspect of this retirements is that I have been cleaning out my files. Pounds and pounds of paper into waste baskets. Why did I save all that stuff anyhow?

I am not waiting to enjoy the travel money, for I leave on June 1st for a month in Sweden, visiting friends and looking into museums for artifacts from Sven Hedin's travels in central Asia.

What have I been doing since the time of the last Round Up? Well, continuing to teach environmental geology, elementary geomorphology and paleontology, broadening the latter to include a bit on plant and vertebrate evolution. Then there have also been semesters when I have taught historical geology. Oh, how that has changed since 1954; pages and pages on the Precambrian, instead of a brief mention; and then, of course, plate tectonics.

In January 1986 I accepted Nick Rast's challenge to become his deputy chairman and continued in that position until a year ago. This gave me a real appreciation of the administrative load in the chairman's office (and I think it has gotten worse with computers and e-mail). Then, too, I continued to serve as Director of Undergraduate Studies in the Department, and for the last two years have been on the University Studies Committee. The University Studies requirements replace what many of you knew as General Studies courses. The

new approach isn't too different, but it does include exposure of all undergraduates to certain writing and speech (oral communication) requirements.

I have also managed a bit of travel, both in the U.S. and in Europe. In 1982 I spent several weeks in Paris with friends, one an art historian who guided us into some of the back streets to see remains of the medieval city; in 1984 I took my nephew to Great Britain, Sweden and West Germany; 1986 gave me a chance to see a bit of Switzerland and northern Italy and in the latter, olistostromes, ophiolites and the type section for turbidites; in 1988 I set out by train from Venice to Istanbul, and then toured with a group along the Aegean coast of Turkey (Troy, of course, Pergamum, Ephesus, etc.) and into the central portion of the country to Cappadocia and Ankara. This renewed my interest in the ancient civilizations of the Near East, and if anything comes of it you'll hear about it later. I have also vacationed in New England, the Sea Islands, and last summer saw again the Wyoming Rockies, the site of my field camp when I was an undergraduate.

Although I am now retired, it doesn't mean that you won't be hearing from me. Just to keep my hand in I have accepted the job of chairing a committee of emeriti which will plan for the celebration of the Department's centenary, and we want to know what our alumni/ae would like us to do to mark the occasion.

### ***William Dennen***

My retirement in 1985 was from teaching at UK, but not from Geology. Since moving back to Nahant (Massachusetts) I have established a comfortable relationship with nearby Salem State College where I have a small spectrographic lab and teach the occasional course. Also in the past five years I've had three books published - Geology and Engineering with Bruce Moore and Principles of Mineralogy with Bill Blackburn, both by Wm. C. Brown, and Mineral Resources: Geology, Exploration, and Development published by Taylor & Francis. Presently in the USGS editorial mill are four GQ's representing field mapping done in the middle 1970's.

My latest escapade has been ten weeks in Ghana on a gold concession evaluation. The mineralization is related to a Proterozoic rift and the geology complicated by deep weathering and a nearby Pleistocene impact event that generated a crater four miles in diameter and cast a breccia over a large chunk of countryside.

## ***Frank Ettensohn***

Aside from my normal teaching duties, most of my recent activities have involved my own research or that of my students and a five-month trip to the Soviet Union.

In January of 1989, I finished an NSF supported project dealing with the relationships between regional tectonism and the deposition of the Devonian-Mississippian black shales in Kentucky. This research has led to other projects dealing with the influence of tectonics on the deposition of the entire Appalachian Basin sequences from the Ordovician through the Mississippian, and these projects are the focus of my present research.

Anyway, in February my family and I went to the Soviet Union where I had a five-month Fulbright lectureship in geology at Novosibirsk State University in Novosibirsk, Siberia. Although I was supposed to lecture in geology, I only delivered four geology lectures during my entire stay. However, I delivered many lectures in English (the subject), religion, philosophy, economics and biology, mostly cultural topics in which the Russians had great interest. Life was very difficult by American standards - little food, long lines, poor apartments, and almost none of the standard necessities like soap, toothpaste and toilet paper. Nonetheless, we made many good friends, and I made many professional contacts in the area of black shales, where I do most of my research. These contacts should eventually result in joint research and some professional exchanges.

This trip has left me far behind, and I am still trying to catch up, but I have been able to secure some funding to develop a core-logging manual for oil and gas shales.

But what's really in the back of my head is trying to find some way to return to the Soviet Union to pursue research on black shales there.

## ***John Ferm***

Although the numbers are diminished, the people working in coal geology with John Ferm and Jerry Weisenfluh continue to push forward - graduate students finish their research and find positions, publications go out and projects are funded.

Two major research trends have begun to form. The first is the control of depositional environments by "growth" structures contemporaneous with sedimentation. While we have been successful for some time in identifying peat

swamps, channels, splays and bays we now find that their thickness and distribution is very much controlled by deep (basement?) faulting spaced at 6 to 10 mile intervals. Although the sand bodies that we study have long since lost their oil (alas), our work should yield results that are of interest to the petroleum explorationist.

The second and related trend is in the area of detailed coal stratigraphy (one bed at a time). Coal (peat) is the most sensitive environmental indicator that we have and we are now only beginning to be able to "read" it. While we maintain a Kentucky base for this work some current projects have taken us to the peat swamps of Aarawak and surface mined coal in Kalimantan in Southeast Asia. The end is not in sight.

### ***William MacQuown***

Since 1982 my main activities have been:

Retired June 1983 and led a Petroleum Technology delegation of 38 geologists to China. The Trip was sponsored by People to People and the Chinese Academy of Science. We met with counterparts in eastern China and visited a number of petroleum operations from Beijing to Guangzhou (Canton) including the offshore oil play.

Helped prepare a Geological Registration Bill for Kentucky (1982-84) and served as a lobbyist while President of the Kentucky Section of the AIPG (1984-86) to support the bill. Although the bill was passed in 1984, it was vetoed by the governor because of a nebulous amendment by a house committee. The principal opposition during the 1986 legislature was from the Kentucky Society of Professional Engineers who had the bill killed in committee. Although attempts to prepare a bill for 1988 were ineffective, considerable interest for a bill in 1990 was fostered by rumored plans by engineers to amend their 1938 engineering registration statute to include fields commonly considered the province of geologists, biologists, and chemists. Particularly galling to petroleum geologists and geohydrologists was an alleged proposal by engineers to control all subsurface consulting activity. Fortunately no such wording was included in an engineering bill and other objectionable language was opposed by the Kentucky AIPG forces and the bill was killed in committee. However, no geological registration legislation was introduced.

Retirement has been a time for consulting, gardening, chess, and travelling. Vivian and I had a great trip to Australia-New Zealand last year and plan to visit the Dennens and Fishers in their retirement venues in Massachusetts and Maine.

### ***Bruce Moore***

Continuing the development of the Low Altitude Multispectral system for light aircraft to detect microfracture systems and fracture porosity in rocks. This is being applied to oil and gas exploration and to minerals. Currently working on fracture detection for horizontal drilling projects in Texas and Louisiana and gold-tungsten exploration in Nevada, California and Arizona. Also using the technique on the economic recovery of methane gas from coal in the Bowen Basin of Queensland, Australia.

### ***Stephen O. Moshier***

Since I'm not known by most of you, here's my life story... My research interests are in carbonate petrology and petroleum geology. My present teaching responsibilities are undergraduate and graduate classes in sedimentology, sedimentary petrography and carbonate petrology and freshman historical geology. I also supervise the Teaching Assistants and freshman labs.

I grew up in western New York State. I got my start in geology with a BS from VPI & SU in '77 (that's not really true - I got my start in geology in high school watching the moon walks on TV). SUNY-Binghamton is where I got my MA and did a carbonate sedimentology thesis. I finished in '79, when every graduate had the "oil" crisis of choosing from one of umpteen oil company offers, so I went off to Texas with Mobil.

For three years with Mobil I got to do all sorts of interesting things (foreign well-site work, regional studies, lease evaluations, geophysical mapping, reservoir analysis, production geology). I wanted to develop more expertise in carbonate diagenesis and reservoir description so I headed off to LSU in '82 for a Ph.D. My dissertation topic was microporosity in limestones, a subject that first interested me while drilling chalky-textured limestones in Indonesia. I expected to return to the oil industry, but a depressed petroleum market and an advertisement in *Geotimes* from the University of Kentucky caused me to consider otherwise. My wife Carol, my (then) four-month-old son Joshua, and I moved to Lexington in the summer of 1986. Our second son, Zachary, joined us in April of this year!



Getting the research effort going has been slow, but then I did not expect to have to develop six different classes in my first three years and serve on as many different committees! But now, we have three graduate students studying subsurface Mississippian carbonate facies in eastern and western Kentucky and one student completing a year-long research assistantship to study porosity development and dolomitization in the Silurian Laurel Fm. More recently, we have initiated a study of the deposition and diagenesis of the Pennsylvanian Providence Limestone and associated coals in western Kentucky, a collaboration with Carol de Wet of Franklin and Marshall College and Jim Hower at UK's Center for Applied Energy Research. This summer I finished a manuscript and presented a poster at AAPG on an unusual phylloid alga in the Providence. I am also studying microporosity involved in karst as evident in the Cumberland Mtn. Tunnel. Other activities have included supervising installation of the electron microprobe and service to the Geological Society of Kentucky (election to President in '90 was punishment for organizing the '89 field conference).

I'd like to recognize several UK alumni who have been instrumental in getting our subsurface carbonate program going. They have provided the insight and guidance in developing projects and the contacts that have resulted in some generous funding from the regional industry and productive cooperation with the Kentucky Geological Survey - especially Jon Huffman, Jim Vincent, Jim Murphy, Herb Nicholson, Don Haney, Garland Dever, and John Beard. I'd also like to thank any of you who made contributions to the department toward establishment of the electron microprobe lab.

### ***Kieran O'Hara***

Over the past several years our efforts in the area of structural petrology have been directed towards understanding fluid/rock interaction during deformation and metamorphism. This work is focused in the western Blue Ridge province of North Carolina and southeastern New England. An important finding of this work is that ductile shear zones in the Blue Ridge have lost large amounts of their volume due to interaction with large amounts of metamorphic fluid. The results of this work are published in *Geology* (1989, v. 17, p. 524-527) and in the *Journal of Structural Geology* (1990, v. 12, p. 419-430) and in an article in press with the *GSA Bulletin*. Graduate Student Amy Haak is currently finishing up her Master's thesis research on the nature and composition of these fluids by examining fluid inclusions in these deformed rocks. An interesting finding of Amy's work is that the fluids involved are saline brines. The origin of this high salinity is not well understood at present.

Our work in New England is also yielding exciting results. Fluid inclusion studies of gneisses in the "Avalon terrane" indicate that this region has undergone rapid decompression after the late Paleozoic Alleghenian orogeny. These results will be presented at the upcoming National GSA meeting in Dallas.

Some of our other interests include the history of emplacement of the Pine Mountain thrust sheet here in Kentucky. In collaboration with Sue Rimmer and Jim Hower we examined the temperatures developed at the base of the thrust sheet using coal metamorphism as an indicator of temperature. This study is published in the *Journal of Geology* (1990, v. 98, p. 43-51). As a follow-up study we intend to look at the tectono-thermal history of the Pine mountain thrust and its effect on oil/gas migration in the region. Generous support from the Center for Applied Energy Research will allow Anwar Ahmed, one of our hardest working graduate students, to work on this project over the forthcoming year.

Over the summer my interests have strayed to the unlikely topic of the rare earth element composition of Kentucky coals, and their potential use in identifying provenance of coal forming basins. Preliminary results are promising and we intend to pursue this aspect of coal chemistry in the future. Right now, however, its time to prepare for classes as the Fall '90 semester gets in gear.

### ***Nicholas Rast***

In 1989 Dr. N. Rast stepped down from the Chairmanship of the Department of Geological Sciences and resumed his primary duties as the Hudnall Professor in Geology to promote the science of tectonics, to pursue and encourage research and to educate graduate and undergraduate students. At the same time there was a need to enter participation in national and international geological organizations and to develop contacts in the geological world for the benefit of the Department, the University and the Commonwealth of Kentucky. Therefore N. Rast attended the International Geological Congress in Washington (1989) and participated in the presentation of three papers. Later in the year he was elected as the President (Chairman) of the newly constituted International Division of the Geological Society of America. He has also been invited to become the Technical Program Chairman for the forthcoming annual meeting of the Geological Society in Cincinnati scheduled for 1992 and as result became a member of the Joint Technical Program Committee of GSA.

In 1989-1990 the tectonic studies in the Department centered round essentially three topics: 1) Appalachian structure in North Carolina and Tennessee; 2) Precambrian relationships in New Brunswick, Canada, and Boston terrane, U.S.A., and 3) Theoretical studies of orogenic belts with a special

emphasis on the Acadian orogeny and its plate-tectonic significance in America and Europe, and the tectonics of western Kentucky.

The structure in the southern Appalachians was pursued on the basis of establishing the nature and history of deformation from the Late Precambrian to the Paleozoic, but was concentrated on the relationship between Mid-Precambrian (Grenvillian) gneisses and Late Precambrian metasediments in the Bryson area, North Carolina on the one hand and the structure of Late Precambrian granites and Mid-Precambrian gneisses in the Boone area of North Carolina, both areas having been affected by Paleozoic thrust faults. The results of these studies, that are nearing completion, are being prepared for publication. A preliminary paper was read at the meeting of the Geological Society of America in Tuscaloosa, Alabama in April 1990. At the same time W. Combs has finished the field mapping and observations in the Boone area and has demonstrated that much of the deformation in this part of the Blue Ridge was Precambrian.

The project concerned with the geological structure of the Rough Creek fault zone in western Kentucky is the first among the projected studies of the tectonics of western Kentucky. The work finished by Mr. Lee Higgins, as a part of his Master's degree, has been presented at the International Geological Congress and an extended abstract published. A more extensive paper is at present being prepared for publication in *Tectonophysics*. While these tectonic projects have been designed with a scientific aim in mind, they were also organized to promote education and training in tectonic and structural geology. In these respects very generous support of the Standard Oil Company of California (Chevron) is much appreciated.

Work in the Northern Appalachians and specifically Boston area has yielded spectacular structural and stratigraphic results, which have been presented at the International Geological Congress of 1989 and also published in special papers of the Geological Society of America. This work was carried out in close interuniversity cooperation with Boston College.

### *Sue M. Rimmer*

I am one of the many "new" faces to show up since the last publication of Round-Up, so let me tell you a little about myself. I began teaching at the University of Kentucky in January 1984 while I was in the final stages of completing my dissertation at Penn State. My Ph.D. research dealt with petrography and geochemistry of the Lower Kittanning coal seam, a natural subject for someone with coal "roots" (my grandfather was a Welsh coal miner and I was actually born in Newcastle-upon-Tyne, as in "... coals to Newcastle"). We arrived ("we" being me and my then 7-year old son) a day or so before Christmas

in the middle of one of the coldest snaps we've had in recent years, only to be stranded by a dead car and frozen pipes. Mercifully, we were rescued on Christmas Day by St. Nicholas (Rast). That was nearly seven years ago now, and I must say life has been very busy and interesting since then. I am happy to say that following completion of the dissertation I was elevated to the rank of Assistant Professor, and following several hectic yet exciting years, I was awarded tenure in 1989 and promoted to Associate Professor.

In addition to teaching classes (primarily Physical, Environmental and Organic Petrology), I've spent the years developing a research program in organic petrology and geochemistry, which has been helped by new equipment acquisitions, several of which were purchased with Bond Issue money from the University. The Organic Petrology Laboratory has been well-equipped and now includes two Zeiss Universal microscopes with reflected-light (both white- and blue-light), transmitted-light, and photographic (35 mm) capabilities. In addition, we have state-of-the-art quantitative vitrinite reflectance and spectral fluorescence analysis capabilities. We have a complete preparation lab for pellet preparation and polishing, and a Leco CHN-600 analyzer for carbon, hydrogen, and nitrogen analyses.

One of the largest of the new pieces of equipment is a Rigaku D-Max III automated x-ray diffraction unit. This unit is computer-driven and replaces our old workhorse, the Phillips x-ray diffraction unit that many of you may remember. The new equipment is used by several faculty and grad students in the Department. Projects my students and I are involved in include studies of modern and ancient underclays (a follow-up to work I did as a M.S. student at Illinois), flintclays, Devonian shales, mineralogy of the Fireclay and Blue Gem coal seams, and a study of bottom sediments from the Gulf of St. Lawrence. This last project is in conjunction with Bill Blackburn, who returned to Canada to chair the Department of Geology at the University of Windsor.

In addition to research on the relationships between coal petrography and depositional environments, I have developed a program dealing with maturation of sediments in the Appalachian Basin. This work includes vitrinite reflectance, spectral fluorescence, and geochemical studies of coals and shales within the basin, with a recent emphasis on the Devonian shales of eastern Kentucky and the apparent "suppression" of vitrinite reflectance observed in these sediments. I hope to continue to develop ideas on the burial and diagenetic history of these shales, based on both dispersed organic and clay mineralogic studies. I spent this summer working on Devonian shale projects with Tom Robl at the UK Center for Applied Energy Research (CAER), where I hold a Faculty Associate position.

I really enjoy working here in Lexington. One of the many advantages is having fellow Penn Staters around to work with, including Frank Derbyshire and Jim Hower at the CAER, and also friends like Jim Cobb of the Kentucky Geological Survey who I worked with in the Coal Section of the University of Illinois. As I spent most of my childhood living in various places in the Middle East, it's great to finally put down some roots and I can't think of a better place to do it than Lexington. In fact, here I actually run into friends I went to undergraduate school with (Southern Illinois University), so it really feels like home!

### ***Tom Roberts***

I retired at the end of August, 1983. I highly recommend retirement for those who have not yet tried it. In early May of 1984, I left for Europe on a long journey exclusively visiting friends. I began my visits in Belgium; on to Stuttgart, Kassel, and Hannover in West Germany; Stockholm, with a side-trip to Helsinki; a long visit in Gothenburg, with one-week trips to the island of Gotland and the Dalarna region of central Sweden; Northop Hall in north Wales, near Chester, and finally Glasgow.

I stayed home five weeks, fighting weeds and hot weather. In early August I left for the Orient, joining eleven others who traveled together in China for eighteen days. It was a congenial group and a wonderful trip. After returning to Hong Kong, I went to Thailand, where I spent a few days in Chiang Mai in the north, and then down to Bangkok for a few days. Then I went to the south side of Bali, and enjoyed six fascinating days there. I capped that trip with a wonderful week in Hawaii, and another great week in Los Angeles.

Some of you know that I had a stroke, fortunately quite mild, in March of 1986. I was in the hospital for two weeks, physical therapy for a month, and began hobbling about with a cane about three weeks after the stroke. I hung up the cane in about two months. It was a scary experience.

In March and April of 1988 I had a wonderful trip to Australia and New Zealand. Late in November 1989 I enjoyed a Caribbean cruise on the Rotterdam of the Holland-America Line. It was a wonderful experience. So, as you should have suspected by now, I am enjoying retirement.

## ***Lyle V.A. Sendlein***

I came to the UK campus in August of 1982 as the Director of the Institute for Mining and Minerals Research (IMMR) with an appointment in the Department as Professor with tenure. Up until 1987 I spent most of my time managing the IMMR. In 1987 I taught a graduate level course in Hydrogeology and became interested in working with students and directing graduate student research.

From that small beginning I have expanded to a much larger research effort and am currently directing the graduate programs for eight or so students. I have been collaborating with James Dinger in the Kentucky Geological Survey, John Thrailkill in the Department of Geological Sciences, and Gary Felton in the Agricultural Engineering Department on various sponsored and unsponsored research projects.

A recent Ph.D. student I directed completed the first attempt to classify the aquifers of the Eastern Kentucky coal field. Her work brought together for the first time the unpublished water well data that allowed a first approximation of the classification of these aquifers. A project that involved all of the individuals mentioned above is another first in that a karst groundwater basin has been instrumented so that data on spring discharge, water quality, precipitation and stream flow are being collected on a regular basis so the hydraulics of the system can be determined. An MS student is conducting a geomorphic analysis of the basin with the idea that a morphometric signature can be obtained. Another project, involving James Dinger and a graduate student investigated the impact of underground mining on a channel sandstone aquifer in the Western Kentucky Coal Field. This project was sponsored by a coal company and provided detailed information on the extent of drawdown caused by mining over the last eighty years. A project that has supported two graduate students, an MS and a Ph.D., and sponsored by a Kentucky power company allowed us to investigate the impact of ash disposal on the groundwater in both a karst and alluvial setting. Another unsponsored project is allowing an MS student to explore the importance of a lacustrine deposit overlying an alluvial aquifer of the Tennessee River. The site is located in a heavily industrial area and has been addressed by field techniques involving electrical resistivity and shallow augering.

Studies that have just been completed by four MS students include the analysis of DRASTIC, a technique to assess the contamination potential of groundwater and Wellhead Protection methods developed by the USEPA. These studies are in the final stages of report writing even though the theses are completed and the students have gone to very good jobs in the outside world.

I have been teaching one hydrogeology course each year and for the last two years have been participating in the development of the Environmental Systems Program, a new program offered at the graduate level for students from several disciplines interested in the protection of the environment.

All in all a very busy and enjoyable three years. While I was having all of this fun, I also had to manage the IMMR and for the last year or so have been Acting Chairman of the Department.

### ***Ron Street***

Since 1982 Ron has kept busy studying central United States earthquakes, expanding the Kentucky Digital Seismic Network (KDSN), building up the seismic lab, and establishing the Western Kentucky Strong-motion Array (WKSA). The KDSN, seismic lab, and WKSA are now fully digital, and is equipped with up-to-date instrumentation for doing research on earthquakes and shallow seismic exploration problems. In the last two years, his interests have been moving towards the collection and interpretation of strong-motion data, the delineation of seismic crustal velocities in the central stable platform, and the problem of ground-motion amplification in western Kentucky communities near the New Madrid seismic zone.

### ***John Thrailkill***

Although John Thrailkill has been teaching groundwater courses in the Department since the late 60's, the demand for such courses began to grow in a big way about 5 years ago in response to the demand for students trained in the field. Most of his time is now devoted to working with Lyle Sendlein and Jim Dinger, head of the water section of the KGS and an adjunct professor in the Department, in trying to keep up with the many students now in the Hydrogeology Program. Although now only a graduate program, discussions are underway to expand hydrogeology study to undergraduates as well, due to many job opportunities in the field.

In what time is left, Thrailkill is continuing research in limestone hydrogeology. As with groundwater in general, the environmental importance of karst hydrogeology is being widely recognized, as is the fact that our ability to solve problems in contamination is severely limited by the lack of knowledge of karst aquifers. Most of this research continues to be in the Inner Bluegrass Karst Region around Lexington.

## ***Jerry Weisenfluh***

Dr. Weisenfluh is a research associate in the Coal Geology group directed by Dr. John Ferm. Weisenfluh's principal duties are to organize and oversee coal research projects and to supervise student work on these projects. His main interests are in the application of geology to mining problems.

A number of such research projects have been undertaken in Kentucky since 1982 with the support of coal companies. These include the analysis of coal seam continuity and mineability of the Hance Seam in Bell county, the Hazard No.'s 7, 8 and 9 in Perry and Breathitt county, and the Fireclay and Hindman seams in Leslie and Harlan counties.

The Coal Research Group is conducting an ongoing program of producing descriptive aids for coal and coal-bearing rocks. A photographic guide was prepared for logging core in the Rocky Mountain coal fields and a similar guide for Appalachian coal is in preparation.

Dr. Weisenfluh has been a consultant to international mining concerns for the purpose of coal mine and property evaluation. Two such projects have been undertaken, one in Kalimantan, Indonesia and the other in Mindoro Island, Philippines.



## *Memorial to Arthur Crane McFarlan 1898-1985*

Arthur C. McFarlan, known to students and colleagues as "Dr. Mac", died on April 9, 1985, in Lexington, at the age of 87. He came to the University in 1923 to join Arthur McQuiston Miller, founder of the Department of Geology. In 1927, during Mr. Miller's illness, Dr. Mac became departmental head, a position he held until his retirement in 1967. In this period he built the Department from a two-man faculty to one with nine members. Shortly after coming to the University he led in the development of a graduate program in geology, so that, beginning in 1925, many geology students earned the MS degree at UK. Then, during the years of World War II, he directed the development and teaching of courses in geography. He also served as State Geologist and Director of the Kentucky Bureau of Mineral and Topographic Surveys from 1932 to 1934, and Director again from 1948 to 1958 after the Bureau had once more become the Kentucky Geological Survey. At this time he was among those who successfully lobbied to have the Survey transferred to the University of Kentucky from the politically charged atmosphere of Frankfort. While Director he was instrumental in arranging joint state and federal funding of the program for the topographic mapping of the entire state on the scale of 1:24,000. Kentucky and Rhode Island are the only states to be completely mapped in this detail.

In 1952 Dr. McFarlan was elected Distinguished Professor of the Year by his colleagues in the College of Arts and Sciences, and in Kentucky. In addition to his membership in this society, which he had served as president, he was a Fellow of the Geological Society of America and a member of the American Association of Petroleum Geologists, the Society of Economic Geologists and Paleontologists, and Sigma Xi.

Over the years Dr. Mac came to be recognized as an authority on the geology of Kentucky. His updating and considerable revision (1943) of Dr. Miller's "Geology of Kentucky" (1919) was a major contribution. He was also the author, or co-author, of more than 50 publications on various aspects of Kentucky stratigraphy and paleontology.

As a teacher and departmental head, Dr. McFarlan stressed the importance of field experience in the education of geologists, and semester-after-semester headed a caravan of students going into the countryside every Saturday to gain just such experience. He also initiated a summer field camp in Western Colorado, where undergraduates were introduced to the geology of the Rocky Mountains. It was a tent camp, since Dr. Mac always tried to keep costs for the students as low as possible. As such, accommodations were far from luxurious, but for nineteen

years Dr. and Mrs. McFarlan (Gail) spent several months each summer camping out. Mrs. McFarlan was purchasing agent, nurse, confidant and general resolver of problems for the students.

With the help of Margaret Tuttle of the University's library system, Dr. McFarlan established the Geology Library, and, for a number of years, earmarked departmental funds for its support. He took great pride, therefore, in seeing it become one of the best collections of geological literature in the Southeast.

His dahlias (flowers which bloomed after the return from field camp), were another source of satisfaction. His garden was notable not only for the variety it contained, but also for the size of the flowers it produced, "some the size of dinner plates". Then there was the added enjoyment of trading root stocks with faculty colleagues and friends.

A.C. McFarlan was a big man, and in his younger days a shock of red hair topped off his six feet, five inches. It was thus to be expected that he could wield a geology hammer with the best, but it was perhaps surprising to find that few were his equal in the delicate task of grinding thin-sections down to an even few hundredths of a millimeter.

At the time of Dr. McFarlan's retirement, alumni and friends presented the Department with his portrait, which hangs today in the Pirtle Library of Geological Sciences. They also established the McFarlan Fund, as a token of their appreciation for the education and help that they had received from him. This fund continues to grow, enabling the Department to give financial help to students and student projects, so that it stands as a fitting memorial to Arthur C. McFarlan, for geology and students were an important part of his life.

Arthur Crane McFarlan was the son of the Reverend and Mrs. Frank C. McFarlan. He was born in Mansfield, Ohio, on May 7, 1897, but shortly thereafter the family moved to Cincinnati, Ohio. He received his bachelor's degree from the University of Cincinnati in 1919, and his doctorate from the University of Chicago in 1924.

Mrs. McFarlan (Gail) died in October, 1987. A daughter, Mary Beth Graves, three grandchildren and one great granddaughter all live in Lexington.

## *Memorial to Vincent Edward Nelson 1913-1988*

Vincent E. Nelson died of a heart attack early in the morning of February 17, 1988, at the age of 75 years and 1 month. Vin, as he was known to his friends, was born on January 22, 1913, in Rock Island, Illinois, to parents of Swedish extraction, a heritage of which he was proud. He was reared in Rock Island and earned a Bachelor of Arts degree there in 1935 from Augustana College. Thereafter, he pursued graduate study in geology at the University of Chicago, and was awarded the Kirkham Fellowship in the academic year of 1937-1938. He earned the degree of Doctor of Philosophy in geology from the University of Chicago in 1942. His dissertation was a study of structural relations in the Gros Ventre Mountains of western Wyoming.

Vin met his wife-to-be, Phyllis Peck, while he was a student at Augustana College. Phyl, as she is known to her friends, is a native Chicagoan, but was living at that time in Davenport, Iowa, across the Mississippi River from Rock Island. Fortuitously for both of them, Phyl returned to Chicago in the final year of Vin's graduate study at the University of Chicago. They were married in September 1939, in Evanston, Illinois, and they made their home in Lexington.

Vin began his association with the University of Kentucky in the fall semester of 1938. Among other accomplishments, he contributed significantly to an understanding of structural features in the Pine Mountain area of southeastern Kentucky. During his long tenure as a member of the professional staff of the University of Kentucky, Vin was a wholly effective teacher, whose many students recall with pleasure and gratitude countless associations with him both in and out of the classroom. He also served for several years as director of the geology field camp at Crested Butte, Colorado, and he was particularly helpful to the Department of Geology by maintaining contacts with alumni. From 1943 to 1945, Vin was employed by the U.S. Geological Survey investigating mineral deposits in New Mexico, Idaho, Tennessee, and Washington. From 1961 to 1964 he served as professor, the last two years as chief of party, with distinction, for a University of Kentucky contract team at Bandung Technological Institute in Indonesia. He served as acting chairman of the geology department in 1966-1967 and retired on January 31, 1978.

Vin was elected a member and Fellow of the Geological Society of America in 1948. He was instrumental in establishing the Southeastern Section of the GSA. A group of interested geologists, primarily associated with southeastern universities, held a mineral symposium in Atlanta in 1949. At the close, Vin, full of enthusiasm at the success of the meeting, proposed that the group meet again the following year, and invited them to the campus of the University of Kentucky. After four other universities served as hosts for the annual meetings, the members

of the mineral symposium became the organizers of the Southeastern Section of the GSA.

Vin joined the American Association of Petroleum Geologists in January of 1954. He became a certified petroleum geologist on September 19, 1966. He served on the business committee of the AAPG in 1966 and was a member of the House of Delegates from 1970 through 1972, and again from 1974 through 1979. He was an alternate delegate from 1983 through 1986. When a steering committee met in Pittsburgh in May 1969 to organize the Eastern Section of the AAPG, Vin represented the Geological Society of Kentucky. Vin was general chairman of the Eastern Section meeting in Lexington in 1976. He was secretary of the Eastern Section in 1976-1977, vice-president in 1978-1979, and president in 1979-1980. He was elected to honorary membership in the Eastern Section in 1985.

Vin was a charter member of the Kentucky Geological Society, which was organized in 1940. He was a faithful and enthusiastic member, serving as president of the society twice, and in many other capacities. Rarely did he miss a meeting or field trip. He was elected an honorary member in 1980.

During the summer months of 1954 through 1959, Vin did field work for the Sohio Petroleum Company. These projects involved the Black Warrior Basin in Mississippi in 1954, the Green River and the Big Horn Basins in Wyoming in 1955 through 1958, and the Peace River Basin in British Columbia in 1959.

In 1970, Vin was a Fulbright lecturer at Escuela Superior Politecnica del Litoral in Guayaquil, Ecuador, for approximately three months, and for a short time in Quito. In 1981 the Escuela Politecnica invited him to return to Guayaquil to advise the geology department on student curricula.

Vin was a Fellow of the American Association for the Advancement of Science, a member of Sigma Xi, and a member of the Kentucky Academy of Science. He also belonged to the Torch Club in Lexington. He was proud to have been appointed a Kentucky Colonel. Vin was devoted to his church, Faith Lutheran, of which he was a charter member. He was active in its affairs and served it well in many capacities.

Vin had a genuine zest for life, and lived it to the fullest. He was a gracious host, a great raconteur, and a real gentleman. He died exactly as he wanted to, but not when he wanted to. He fervently wanted to outlive Phyl, whose vision has become seriously impaired in recent years, because he wanted to continue helping her as he had been. Alas, it was not to be. In addition to Phyl, Vin is survived by a daughter, Andrea Bottoms, a grandson, a granddaughter, two sisters, and one brother. His family and colleagues, former students, and many other friends miss him sorely.

## FACULTY PUBLICATIONS

We have listed faculty publications since 1982 for your information. It gives you an idea of the research activities of the department.

### *Charlotte Allen*

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### *Lois Campbell*

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Edit, Introduction to the Earth, Lab Manual for Physical Geology, Tichenor Publishing, Bloomington, IN.

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**UNIVERSITY OF KENTUCKY**

*Department of Geological Sciences*



Masters and Doctoral Theses  
Listing



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- Ammerman, Michael      A gravity and tectonic study of the Rome Trough, M.S., 1976
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