

# **ALUMNI NEWSLETTER**

**1992**

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**Thanks to Rochelle, Candy, Kathleen and Becky  
for putting this newsletter together.**

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**On the cover:**

**The cover image displays a special type of volcano, termed "scaloped domes", discovered on the surface of Venus in radar data collected by the Magellan probe. Scaloped domes are typically between 10 and 30 km in diameter and 500 to 1000 m in height. Their identifying characteristic is the presence of scaloped edges that are thought to be the result of modification by slope failure; the scallops have the form of landslide scars. Radar-bright (high surface roughness), lobate deposits adjoining the scallops appear to be debris aprons formed by the slumped material. The pictured example is about 25 km in diameter, with an indentation in the flat top that represents the vent of the volcano. The large, bright lobe to the left is interpreted as a debris apron. (Note that illumination is from the left in this image.)**

**The Department has a complete set of Magellan data on CDs which some students are using in their research. This is an image from research done by Kathi Beratan.**

## **Chairman's Letter**

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### **T.A.'s Tale Year Five - Second Term Sophomore Is there a Slump?**

**Dear Alumni and Friends:**

Things appear to be on an even keel here at G&PS. We are proud of Jack Sharkey who was awarded the "Outstanding Service Award" for outstanding contribution, service and dedication to Chemistry undergraduates and undergraduate Chemistry programs presented by the American Chemical Society - Student Affiliates. We have also benefited from an internal self-appraisal from which a five-year plan of personnel needs and departmental educational and research objectives emerged. The series of meetings with Dean Koehler culminated in a presentation to Provost Henderson. On the heels of our year-old appraisal we have continued discussions of courses and curricula that may appropriately fill the need, expressed by our students, to offer an environmental certificate. Identifying a satisfactory package of courses has been no easy task.

We are faced with altering a full curriculum which, most faculty strongly feel, has proved its worth. (If it ain't broke, don't fix it.) Nevertheless we wish to be as accommodating as possible without creating a curriculum with an unreasonable number of credit hours. The struggle continues.

Our attempt at addressing the needs of student geologists tackling environmental problems coincides with a university-wide effort to address environmental studies in an integrated, comprehensive way. Bud Rollins, Jack Donahue and I participate as departmental representatives in the effort to forge an integrated, comprehensive program.

The departmental graphics laboratory has been enhanced as a result of the efforts of Bill Harbert, supported by V.J. Singh, Associate Provost. G&PS acquired and installed a geographic information systems package. The GIS system may be accessed from Sun workstations on campus. Presently the department has a data library that includes: 1) All NASA Interplanetary images of Venus (approximately 14 CD-ROMs of data; 8.4 gigabytes of images available); 2) All Magellan synthetic aperture radar (SAR) images 70 CD-ROMs, 5.6 gigabytes; 3) All National Earthquake Center (NEC) earthquake location and parameter data (11 CD-ROMs; about 7.2 gigabytes); 4) Digital topographic data for the entire world surface and oceans, including higher resolution data sets for North America and Australia (about 300 megabytes); 5) Approximately 2.8 gigabytes of a variety of remote sensing data such as Landsat TM, MSS, SPOT, AVHRR, SLAR, and SAR data from selected regions; 6) Digital magnetic anomaly map of the former USSR (about 400 megabytes); 7) European Space Agency ERS-1 Synthetic Aperture Radar high resolution images (200 megabytes); and, 8) In negotiation: high resolution (100 meter spacing) digital topography data set for the United States (1000 megabytes).

Among departmental education activities, 34 courses were conducted by ten faculty of which 3 were available for half-time. The average full-time faculty load was four courses. Two thousand five hundred and sixty one students were enrolled in these courses.

About 25 research proposals with a value of more than \$2,500,000 were submitted during the past year. Roughly \$650,000 have been awarded.

Undergraduate enrollment has returned to past levels of about 40 students total in the junior and senior classes. Graduate enrollment is steady at about 30.

Thanks to each of you who were able to make a contribution during the past year. I hope that you find the newsletter informative and that it brings pleasant memories. Please keep us informed of your professional and family news.

**THOMAS H. ANDERSON**

Hal Rochelle Chesterpal urges me to get this job done so that I will not delay the Newsletter. She has also informed me that in spite of my vigorous and aggressive response to her plea that I am nevertheless last in getting my report to her. Rats!

This past year saw a switch from years of study in northeastern Mexico back to Sonora in the northwest. Two different but related problems are on the forefront. Both of these problems have to do with the question – how is Cretaceous tectonism expressed in the rocks of Sonora? The Sevier/Laramide fold and thrust belt is a clearly distinguished zone which may be traced from the Canadian Rockies southwestward where it wraps around the rigid Colorado Plateau. At this point, the character of the fold and thrust belt changes from typical, rather shallow structures which affect mainly sedimentary layers, to ductile faults which involve deeper-seated metamorphic rocks. From the ranges along the Colorado River, south and southeastward a conspicuous fold and thrust belt is not obvious in Arizona nor Sonora. We are struggling to understand just how Cretaceous mountain building processes operated in this region.

An area where metamorphic rocks are involved in presumably Cretaceous processes is known in Organ Pipe National Monument and I am attempting to track these structures into Mexico. Hundreds of kms. across the state, where Mary Beth Kitz McKee did her dissertation, Cretaceous deformation involves great submarine gravity slides. In this region Jim McKee, Mary Beth and I are carefully mapping some of these regional, mountain-sized masses.

All this stuff required two trips to Mexico during the early part of '92. The shiny new Montero is now a veteran of close to 40,000 miles. My, time does fly.

Patti Campbell spent some sunny days (115°F) in April dutifully collecting oriented samples for microstructural analysis near Organ Pipe. (Be smart T.A., March is the limit!)

In late Spring, I refocused upon Appalachian rocks and co-authored with Dave Brezinski, Mark Evans and Patti Campbell papers on ductile deformation zones and east-west shortening. One result of the work in Maryland has been the recognition of a regional detachment surface in the Cambrian strata. We are not sure what this means other than that beds throughout a wide area slid from one spot to another along a single flat (?) surface! Very odd – highly intriguing.

Bill Elinski is struggling to delineate faults and other structures which may delineate the northern flank of the North Mountain Thrust. Mark Evans (Georgia Southern) continues to study this thrust system and related structures in Virginia.

At the G.S.A. national meeting in Cincinnati this Fall, I participated in two papers which reported results from the study of ductile structures in both northwestern Sonora and Maryland.

All of the above fun research stuff was complemented by teaching structure and geology for non-majors as well by participation on lots of committees. The most time and energy consuming is the Faculty Senate Plant Utilization and Planning Committee. The initiation of the "Jumpstart" program which may pump tens of millions of dollars into University construction projects means that the 400 lb. gorilla has rolled over and has a passionate look in its eye!

Sara Lee is a graduate student at Boston University, where she studies international stuff. Garrett has switched from physics to Chinese at Princeton?! Tanna has returned from coaching and is cogitating upon her future.

Regards to all.

**KATHI BERATAN**

After almost one full year at Pitt, I like both Pittsburgh and this department a lot. My computers are (finally) up and running, and my research is progressing.

My primary research focus is in basin analysis, particularly in regions that have experienced crustal extension or strike-slip faulting. Syn-extensional sedimentary and volcanic deposits provide information about the timing and nature of surface events, and can be used to test tectonic models. Techniques used in my field-based research include sedimentary facies analysis, paleocurrent analysis, and detailed stratigraphic correlation. Study areas include the Whipple Mountains of southeastern California, a classic "metamorphic core complex", and the Avawatz Mountains in the southern Death Valley region of California, at the junction of the Garlock and Death Valley fault zones.

Secondary interests include the use of remote sensing techniques, applied primarily to Landsat Thematic Mapper and AVIRIS data, to resolve geologic problems. Working closely with collaborators at the Jet Propulsion Laboratory in Pasadena, California, I use the images to guide field work; the images provide a large-scale view of the distribution of rock types and structures that is impossible to get from the ground. Specific projects include identification of shorelines of Plio-Pleistocene lakes in the central Mojave Desert of California, mapping detachment-related alteration in the Whipple Mountains, and, with Dr. Cassidy, looking for a long-lost meteorite in Argentina.

Student research projects are keeping me active in planetary research, particularly comparative planetology studies of tectonic processes. I now have three students working with me. Kevin Riley, using Magellan radar data, is looking at highly deformed areas on Venus in order to better understand how Venus tectonics works. Bob Anderson and Nick DeLillo will be using remote sensing techniques combined with field work to study particular features on earth, and will then use this information to interpret Martian data. I am hoping for my first sedimentology student next year (I'm a sedimentologist, really!).

**MICHAEL BIKERMAN**

After the intense and marvelous Semester @ Sea voyage of Spring, 1991, it would seem that this year would have been a drag. Far from it...I found classes back on land and my research both invigorated, and the experiences from the voyage often useful in class.

This summer was spent mostly in getting the argon laboratory up and running, and turning out a series of argon isotopic analyses. The refurbished MS-10 mass spectrometer has been running very well. Samples run include a suite from New Mexico, several mineral separates from the Adah/Masontown dike (Henry Prellwitz' thesis samples), and some samples from Russia - a project of Sasha Helpetz, one of Professor Harbert's students. Analytical work sandwiched a day on the dike with Henry and a friend of his, ducking mosquitoes while collecting some more material; and a two week vacation in Colorado seeing some good geology and good friends.

This year I was elected President of the Board of Governors of the Faculty Club - in time to be there for the major changes which have gone on in the food service contractor, and University administration. Marriott now does the food service for the whole university, and we expect a good relationship with them. My membership on the Senate Committee for Community Relations continues for the year.

**Michael Bikerman, continued**

Classes taught 92-1,2 (1991-1992) included Physical Geology, Geochemistry and World Physical Geography in the Fall, and Isotope Geology and Geography in the Spring (former Winter) semester. This year (1992-1993) the Fall schedule is the same, and the Spring will have me teaching Geology 0800 and Ore Deposits.

It is encouraging to see enrollments go up in the major courses - Physical Geology this term is highest since the early 1980's, and geochemistry is the highest since I have taught it. We are reintroducing Physical Geology into the Spring term after a lapse of many years, though I will not teach that class now.

The paper on the Isotope geology of the Mogollon-Datil volcanics was published in Contributions to Mineralogy and Petrology this spring, and a paper on the Canadian studies languishes somewhere north of the border.

As always, you are welcome to stop by and see the lab, or just visit.

### **UWE BRAND**

This past year was most exciting for the field of biogeochemistry. In co-operation with Ellis Yochelson, Smithsonian, we have discovered the oldest primary biogenic non-marine aragonite in pelecypods from the Wutonggou Formation (Permian) of northern China. This discovery was improved on by finding similarly preserved material in the calcareous shale horizons of the Joggins Formation (Pennsylvanian), Nova Scotia. This site is protected under the World Heritage Foundation for its splendid flora (trees, etc.) and fauna (amphibians, etc.) as well as numerous tracks. First results of this find were presented at the Geological Association of Canada Annual Meeting this past spring in Wolfville, Nova Scotia.

### **DAVID K. BREZINSKI**

My work on the western Blue Ridge of Maryland, Pennsylvania and West Virginia is winding down and has culminated in the production of a report for the Maryland Geological Survey on the lithostratigraphy of the western Blue Ridge of Maryland. This study will be in-press shortly. As the western Blue Ridge study winds down, I am beginning to gear-up for a stratigraphic study of the eastern Blue Ridge, and Cambrian carbonate rocks of the western Piedmont in Maryland.

This past year I have finished a study of Permian trilobites from west Texas. Unfortunately, most all of the specimens were previously collected and housed in the National Museum so I did not have an opportunity to collect them myself.

I also continued my study of Carboniferous trilobites of the Cordilleran. In April Albert Kollar of Carnegie Museum and I spent two weeks in Texas, New Mexico, and Arizona collecting some Mississippian rocks.

**JOHN L. CARTER**

I am still busy with my contribution for the TREATISE ON INVERTEBRATE PALEONTOLOGY, desperately trying to acquire good illustrations. Last year I went to Russia in order to photograph type specimens and this January I went to China to do the same thing. Although I had been assured by my Chinese colleagues that their institutes had central heating it turned out not to be the case! I was forced to work in numbing cold for 17 days, bundled up and wearing gloves. Next time, if there is one, I'll go at a warmer season!

**WILLIAM A. CASSIDY**

Last year was rather different because I did not go to Antarctica and – a pleasant surprise! – I had three months I hadn't had before. I didn't miss it at all, and so will not go again this year. I'm a little worried that they'll get the feeling they don't need me anymore, however, so I will return next year. Ralph Harvey managed very well as field party leader, and will do it again this year. The grant was renewed, for five years this time, with Ralph as Co-Principal Investigator.

The field season was very successful. The field party was all male this time, and contained a Spanish and a Russian geologist. They were put in by a C-130 making an open-field landing near the Pecora Escarpment, which is a small nunatak less than 300 miles from the South Pole. We had visited the site in an earlier field season and knew there were meteorites there. Initially, however, they traversed to the Patuxent Range, a pile of Upper Proterozoic sedimentary rocks overlain unconformably by Cambrian limestone. Ralph says they are similar to the Grenville and they look a lot like the Appalachians would with all the soil and vegetation stripped off. There is a vast area of exposed ice there. On the aerial photos, and flying over it, this site looked like a great place to find meteorites, but disappointingly, they only found about thirty-five. On the way back, however, they found some small concentrations here and there that built up to a nice collection. Systematic searching at the Pecora Escarpment was very fruitful also. During the last week of the field season we got the use of a twin-otter aircraft to visit some nearby small icefields and picked up another thirty or so specimens. Total take for our latest season of scavenging was around 600 specimens.

It has been an interesting experience to use the Magellan hand-held Global Positioning System (GPS) units for field mapping. I told you last year about our 1990-91 experience with them, and getting  $\pm 3$  m accuracies in our latitude and longitude readings. During last field season we used them in their differential mode and attained accuracies of  $\pm 1$  m. We just had our four units upgraded to read five satellites simultaneously, and this should give us further advantages. I feel confident that these instruments represent the future in field mapping. Geologists, take note!

I spent a substantial fraction of my time during the year just past in working on a review article titled, "The Meteorite Collection Sites of Antarctica." Including me, the article has five co-authors and, between us, we have seen all the Antarctic meteorite stranding surfaces. We describe them, and hypothesize as to their origins. This paper will appear in the December, 1992 issue of the journal Meteoritics. It's long, but it has a lot of nice pictures: I hope you will all read it.

Suzanne Traub-Metlay is fleshing out a PhD thesis on the natural thermoluminescence properties of meteorites from the stranding-surface at the Allan Hills Main Icefield. Her current schedule calls for finishing in April.

William A. Cassidy, continued

Chris has his vacuum system running almost perfectly and is about to begin his experimental work. So far, he's learned a lot about trouble-shooting leaks and we hope this experience will pay off in the very near future.

In closing, let me remind you of my guiding principle: "What am I doing here, if I'm not having fun?"

### **MARY DAWSON**

Latest Paleocene and earliest Eocene rodents from a variety of localities have been receiving research attention. These include rodents from a locality in central Mississippi, which is the subject of a research project by Chris Beard, Alan Tabrum, and Mary Dawson. This is the first locality in the Gulf Coast to yield a good mammalian record from this time interval, so it has considerable importance in adding to the understanding of Paleogene evolution and geographic distribution. Dawson and Beard initiated a project on the vertebrate fauna of a middle Eocene fissure deposit in Jiangsu Province, China, with their colleagues from the Institute of Vertebrate Paleontology and Paleoanthropology in Beijing. Work is continuing on the Arctic Miocene fauna from Devon Island and on the Arctic Paleogene plagiomenids and pantodonts from Ellesmere and Axel Heiberg Islands.

### **JACK DONAHUE**

1992-93 is proving to be an interesting and busy year. The Society for American Archaeology held its annual meeting in Pittsburgh where I chaired one symposium on El Niño history and deposits in South America. Two of my students in Anthropology, Rick Duncan and Martin Feuss, gave papers on work we had done on Danger Cave and West Indies pottery. The journal Geoarchaeology continues to do well and expanded from a quarterly to a bimonthly publication schedule in 1992. The summer saw a return to Barbuda, an island in the Northern Lesser Antilles for the first time since 1984. Tim Evans and I, working with Dave Watters, an archaeologist at the Carnegie Museum, were able to document an old (ca. 4000-5000 yrs BP) shoreline where prehistoric occupants were most likely harvesting the snail Strombus gigas as a food source. Tim will be working on samples from the locality for his Masters thesis.

Jessie and I are enjoying life in the country and getting used to being by ourselves again now that Mike and Jack are off on their own with Mike finishing his degree at Penn State and Jack in his junior year at Pitt.

### **BRUCE W. HAPKE**

This has been an exciting year: I finally finished a book that I have been working on for several years. The title is "Theory of Reflectance and Emittance Spectroscopy". It is a detailed exposition of the analytical theory of reflectance and emittance by planetary regoliths that I have been developing over a long period of time. It will hopefully appear in print early next year.

In other developments, last year I published a paper that accounted for several puzzling properties of the radar signals reflected by icy satellites by a phenomenon known as "coherent backscatter". The model has been widely accepted by the radar science community. I speculated that coherent backscatter

**Bruce W. Hapke, continued**

may also explain the so-called "opposition effect", which is a sharp spike in the brightness of sunlight reflected from planetary regoliths near zero phase angle. This effect has been known for over a century, and has traditionally been explained as a result of shadow-hiding, in which grains of soil cast shadows on other grains, but at zero phase these shadows are hidden by the grains that cast them.

I have obtained several samples of Apollo Lunar soil and have been working with Bob Nelson at JPL to measure their reflectances in polarized light to see if we could untangle the two processes. It now appears that the effect in light scattered by the Moon is caused almost entirely by coherent backscatter. By extension, it is highly likely that the opposition effects of most solar system objects is also caused by coherent backscatter, rather than shadow-hiding. This discovery will have major implications for the interpretations of remote sensing observations. We are presenting a paper on this at the Oct. 1992 meeting of the Division for Planetary Sciences.

### **WILLIAM HARBERT**

This has been a busy year. Vic Schmidt and I are very happy to have a new computer controlled alternating field rock demagnetizer and sample transport system up and running in our paleomagnetic lab. In addition we have a large number of sample ovens for thermally demagnetizing rocks. In total our lab has been really quite upgraded over the last few years. A new Chinese graduate student, Xi Xu, is now working hard on samples collected just north of the Chinese-Mongolian-Russian border in 1989. These are Paleozoic in age and will constrain the paleogeography of this region during the Permian.

Last spring I taught an interesting graduate class, which was focused on using computer workstations for geological applications. The students completed a variety of problems and worked on a project using some of the digital elevation models for the U.S. and world, and remote sensing data sets which we now have. It was a lot of fun for everyone involved. During the course I also learned something about remote sensing. In addition, two graduate students and I attended an international remote sensing meeting held in Washington D.C. The state of the art in classified remote sensing seems to generate images with a 5 cm (centimeter!) resolution. Unclassified high-resolution images are available from ex-military Russian satellites, which have a 3 meter resolution. These come in 30cm by 30cm film negatives. A French satellite, SPOT, collects stereo pairs of 15 meter resolution images. These can be automatically used to generate digital elevation models which are ten times more detailed than presently available for the lower 48 states of the U.S.. As a result of all this, the U.S. remote sensing capability is in third place: very expensive and significantly lower resolution than is available from French or Russian satellites.

I have been collecting software and data for a new Remote Sensing class to be offered this spring. This class will make great use of the new "Advanced Graphics Computer Lab" recently installed by the Computer and Information Services group at Pitt. With the help of Kathi Beratan we have obtained a large number of remotely collected datasets. Included in these are LANDSAT MSS, TM and French SPOT images; also a large number of synthetic aperture radar (SAR) and side-looking radar images (SLAR). Some of the high-resolution SAR images are of northeastern Russia and come from a European Space Agency satellite. The resolution on the SAR images, obtained with a grant from NASA, is about 10-30 meters per pixel. With this hardware/software we are leading the university in terms of a geographical information system (GIS) capability.



William Harbert, continued

Alexander Helphetz and I attended the International Conference on Arctic Margins recently held in Anchorage, Alaska. Together we presented the paleomagnetic and plate tectonic research we had been conducting. It was an interesting meeting in that about 40 Russians attended, including two friends from previous field work. However, things are not well in Russia! The inflation rate for last year was 1,270 percent (this is not a misprint). Airfare from Moscow to the eastern part of Russia was 50,000 roubles, a bottle of vodka is now about 200 roubles. Everyone was aware that the present situation is explosive, however none of my friends had any idea what would follow the present government. Best regards to everyone!

### **EDWARD G. LIDIAK**

The scholastic year began on a busy note with three classes to teach this term. It is always great fun to begin a new scholastic year with the challenge of facing new students and trying to get them not only to listen but to become enthusiastic about various aspects of geology and related topics. Somewhere in the process, it even gets me excited and enthusiastic all over again. It's sort of a re-birth every year.

The past year was another interesting one for me. I attended the annual Geological Society of America meeting in San Diego where my colleagues and I presented a research paper on the geochemistry of some Puerto Rican volcanic rocks. These rocks are very interesting chemically as they are among the most potassic basaltic igneous rocks known from an oceanic region. In February, I attended the annual DOSECC (Drilling, Observation, and Sampling of the Earth's Continental Crust, Inc.) meeting at Lamont Geological Observatory in New York. During the meeting, I was elected Vice-Chairman of DOSECC for a three-year term. My duties, as best I can determine, are to hope the Chairman does not step down and to play golf whenever possible. Perhaps it is my golfing interests that qualified me for the post. As part of the meeting, we took a field trip into the nearby Newark Basin, a continental rift structure, that has been of considerable geologic interest recently. A series of six wells have just been drilled into rocks of the basin, and cores of the entire stratigraphic section are now available for study. It is probably the only rift basin on earth where the entire stratigraphic section is available for study.

My research took me into the Caribbean twice this past summer. (I know, it's a tough life, but someone has to do it.) In June, I spent a week each in Puerto Rico, St. Thomas/St. John, and St. Croix trying to understand the geology a little better and collecting rock samples. The geology of these islands is truly fascinating and the scenery and beaches are superb. Some of you may regard doing field work in such places more like a vacation than actual work. You are probably correct as most of the best rock exposures are along the seashore. Where else can one do field work in swimming trunks and a tank top? However, at times, when climbing along a sea cliff or struggling to walk up a narrow, steep river valley, the field work can actually be rather arduous.

I also attended the 13th Caribbean Geological Conference in August where I presented three research papers. The meeting was held in Pinar del Rio, Cuba, which is in the western part of the island. I went on several field trips while there and on one trip saw some of the most spectacular karst topography I have ever seen. The Cubans were very friendly to us and the meeting was interesting and informative. I particularly enjoyed talking to the Cuban geologists and learning

Edward G. Lidlak, continued

their views on aspects of Caribbean geology. Most seem to emphasize field Lidlak geology over laboratory studies as lab facilities are not readily available to them now that the central and eastern European countries are no longer associated with Cuba. I was surprised to learn that there are currently about 2,000 practicing geologists in Cuba out of a total population of 10.7 million. This is certainly a high proportion and demonstrates the importance of geology in Cuba.

### **WALTER PILANT**

This last spring and summer I continued seeking the mysterious Harper's Magnetic Unit in Maryland. This time I used the services of Xu Xi and Bill Elinski who both worked through heat, humidity, bugs, and even a downpour. But we obtained lots of good data and a few surprises in the Dargan area (across the river from Harper's Ferry). As a result of this "filling in the gaps" work, I am now working on a map of South Mountain in the Keedysville quadrangle, and a fence diagram of a large number of magnetic anomalies in the area upon which I base my interpretation.

As for maps, I was able to obtain two quadrangles, Keedysville and Middletown on floppy disks with all the culture and the contours. I was then able to select a subset of this data upon which to make the geologic map referred to above. This really makes it a lot easier to get out maps, even though one quadrangle with contours is about \$500. Downplunge projections still interest me. I have updated the program so that it can take advantage of a Hercules graphics board, and I soon hope to have a version that will output DXF files. These can be then be imported into several drawing programs from which they can be exported to a laser printer.

### **HAROLD B. ROLLINS**

My research activities over the past year have been diverse. The Predictive Stratigraphic Analysis (PSA) Initiative of the USGS is still "cooking", and has involved many meetings and a few field trips. Our hopes are to achieve high resolution "time slices", complete with detailed reconstruction of paleoceanography, climate, etc., etc. If successful, for the first time we will be able to address elusive patterns of Upper Paleozoic faunal migrations among basins, province - level interaction, and many other paleobiologic phenomena.

In addition, my St. Catherines Is. research is ongoing. We visited the Island several times last year, continuing projects on biodiversity and clam recruitment (with R. Prezant, I. U. P. and R. Toll, Univ. of the South). We are indebted to the E.J. Noble Foundation, Inc. for their many years of funding our research on the Island. In terms of S.C. Is. research, Pat Rowe successfully defended her Masters thesis dealing with environmental control of trace element chemistry in the shell of the hard clam, *Mercenaria mercenaria*. Uwe Brand graciously provided needed expertise and complete access to his lab at Brock University for these analyses. Dave Linsley is close to completion of his PhD dissertation on the Pleistocene and Holocene "evolution" of S.C. Island.

Bob Zei defended his dissertation ("Marine Intervals of Lower to Lower Middle Pennsylvanian - "Pottsville" - Rocks of the Appalachian Basin) last January. Bob is currently teaching at Kutztown University. Wendy Brindle also defended her dissertation on morphological analysis of Pennsylvanian fusulinids

Harold B. Rollins, continued

over the summer. She is now at Harvard, working with Steve Gould. Pete Hutchinson defended his dissertation on xenobiotic responses of the shell of the freshwater Asian clam, Corbicula fluminea. He has developed a very promising bioprobe for organic contamination of freshwater systems and a possible new technique for bioremediation (patents pending). Two papers are already in press on these discoveries (see bibliography). Seems like we are doing quite a bit of research in environmental science these days! In fact, Uwe Brand and I have initiated a project at French Creek, near Meadville, Pa., using freshwater mussels as environmental recorders. We are able to use the University of Pittsburgh Pymatuning Ecology Lab as a base for these studies and have one student, Roman Kyshakevych, already working on the project.

On a more personal side, Judy and I visited Sanibel Island over Christmas, 1991 and, while there, managed some fine fossil collecting in the famous Pliocene Pinecrest Beds near Sarasota.

### **VICTOR A. SCHMIDT**

Bill Harbert and I continue to be busy, and this year has been especially so. We have installed our new superconducting rock magnetometer and it works beautifully. One of its best features is that it drinks liquid helium very slowly — a fill of 50 liters looks like it will last us for 500 days. Previously, the same amount would last us less than two weeks, so this represents a large savings to our research accounts. The magnetometer also sports an automatic sample handler, and together with our recent purchase of an automated alternating-field demagnetizer, we now have a fully computer-controlled setup for doing AF demagnetizations. That is just becoming fully operational. The new equipment (including a new thermal demagnetizing oven) should improve our throughput of samples considerably. These improvements once again bring our paleomagnetism lab to the state of the art.

Current projects include still additional early hominid sites in South Africa, lots of cave sediment projects (three in conjunction with Penn State, Tennessee Tech, and Southern Indiana State), and the continuing work in Railroad Canyon on the Idaho-Montana border, which is a Miocene magnetostratigraphy project.

My interests continue to expand. I'm involved in a three-year funded project with Alan Lesgold of the Learning & Development Corporation on campus in utilizing artificial intelligence techniques to teach augmentation skills in Earth Science.

My teaching has certainly evolved over time — from my early days when the faculty would only let me teach graduate level specialized geophysics courses like Solid State Geophysics (no longer offered) and Physics of Rock Magnetism (hasn't been offered except as Directed Study for many years), to now, with my current courses, which are mostly undergraduate geology! My current repertoire includes Geology of the National Parks (for poets and musicians), Planet Earth (in the external studies program for undergrad General Studies majors and in the Honors College for bright poets and musicians — both using the book I wrote in 1986 for the television series of the same name), Groundwater Geology (for undergrad majors, and currently a very popular course), and Geomagnetism and Paleomagnetism (with Bill Harbert, graduate level). How times change!

Victor A. Schmidt, continued

As if this weren't enough, I've just been appointed Chair of the Executive Committee on Academic Computing, which is the faculty oversight committee for all of Academic Computing at Pitt. It's the only faculty committee that actually has a budget, overseeing about one million dollars of capital funds for public computing facilities per year. I'm not too sure just how I got into this, but I probably opened my big mouth too many times.

All best wishes to alumni and friends.

### **JACK SHARKEY**

For several years my primary research effort has been to investigate the surface properties of coal. This research was started under a grant funded by the Department of Energy in 1986. Changes in the surface properties of coal, such as oxidation, can alter combustion, liquifaction, pyrite removed and other reactions of coal. The removal of pyritic sulfur is very important as all forms of sulfur in coal must be reduced to lower harmful emissions from coal combustion. Surface analysis techniques including Laser Mass Spectrometry are being used for this investigation. With the Laser technique, the surface is sampled to a depth of 1 micron. This research is carried out in the Surface Science Center of the Chemistry Department where I continue as a member of the Research Faculty.

Interest in the Introductory Mass Spectrometer course remains high with 31 students registered in the Fall Term. About half of the students are from laboratories determining EPA priority pollutants. EPA selected combined Gas Chromatography - Mass Spectrometry as the instrumental technique for all priority pollutants. I am also teaching a one credit course in Instrumental analysis for G&PS majors. Faculty from other departments, having equipment not available in G&PS, are giving lecture-demonstrations of instruments such as SEM and XRD.

I have continued my activities in three technical societies: The Pittsburgh Analytical Conference, The Spectroscopy Society of Pittsburgh and The American Society for Mass Spectrometry.

**THOMAS H. ANDERSON****Abstracts:**

- Anderson, Thomas H., and Campbell, Patricia, 1992, Mylonite at the Mojave-Sonora Megashear, Northwestern Mexico, Abstracts with Programs Geological Society of America Annual Meeting, vol. 24, no. 7, p. A147.
- Brezinski, David, Campbell, Patricia, Anderson, Thomas H., 1992, Evidence for Detachment of the Cambro-Ordovician Carbonate Sequence In the Central Appalachians. Annual Meeting of the Geological Society of America, Cincinnati, v. 24, p. A147.
- Campbell, P., Brezinski, D.K., and Anderson, T.H., 1992. Ductile Deformation zones along the west flank of the northern Blue Ridge. Abstract with Programs of the Northeast Section of the Geological Society of America, Harrisburg, v. 11, p. 11.

**KATHI K. BERATAN****Articles:**

- Beratan, K.K. and Murray, B., 1992, Stratigraphy and depositional environments, southern Confidence Hills, Death Valley, California. San Bernardino County Museum Quarterly, 1992, v. 39, no. 1, p. 7-11.
- Pluhar, C.J., Holt, J.H., Kirshvink, J.L., Beratan, K.K., and Adams, R.W., 1992, Magnetostratigraphy of Plio-Pleistocene lake sediments in the Confidence Hills of southern Death Valley, California. San Bernardino County Museum Quarterly, v. 39, no. 1, p. 12-19.
- Beratan, K.K., 1991, Miocene Synextension sedimentation patterns, Whipple Mountains, southeastern California: Implications for the geometry of the Whipple detachment system, Journal of Geophysical Research, v. 96, p. 12,425-12,442.
- Nielson, J.E. and Beratan, K.K., 1990, Tertiary basin development and tectonic implications, Whipple detachment system, Colorado River extensional corridor, California and Arizona, Journal of Geophysical Research, v. 95, p. 599-614.
- Beratan, K.K., Blom, R.G., Nielson, J.E. and Crippen, R.E., 1990, Use of Landsat Thematic Mapper images in regional correlation of syntectonic strata, Colorado River Extensional Corridor, California and Arizona, Journal of Geophysical Research, v. 95, p. 615-624.

**Abstracts:**

- Guest, J.E., M.H. Bulmer, K.K. Beratan, G. Michaels, and R.S. Saunders, 1991, Gravitational collapse of the margins of volcanic domes on Venus, Lunar and Planetary Science Conference, Houston, TX.
- Beratan, K.K. and J.E. Nielson, 1991, Test of "hinge" models with synextensional deposits, Whipple detachment system, California and Arizona, Geol. Soc. Am. Annual Meeting, San Diego, CA.

- Beratan, K.K., 1991, Mid-Miocene sedimentation patterns and landform development in the Whipple Mountains, southeastern California: Mojave Desert Quaternary Research Symposium, San Bernardino County Museum, Redland, CA.
- deCharon, A.V., D.L. Blindschadler, K.K. Beratan and J.W. Head, 1991, Geology of Alpha Regio, Venus from Magellan data, Lunar and Planetary Society Meeting, Houston, TX.
- Beratan, K.K., Crippen, R.E., Blom, R.G. and Wade, M.S., 1991, Exploratory analysis of AVIRIS data, ERIM/Thematic Conference on Geologic Remote Sensing, Denver, CO.
- Beratan, K.K., and Nielson, J.E., 1991, The Colorado River extensional corridor: An analog for the early stages of passive margin formation, Annual SEPM/AAPG Pacific Sections Meeting, Bakersfield, CA.
- Buising, A.V. and Beratan, K.K., 1990, Upper Tertiary strata documenting the shut-off of detachment faulting of western Arizona, Geological Society of America Annual Meeting.
- Beratan, K.K., Blom, R.G., and Crippen, R.E., 1989, Use of Landsat Thematic Mapper images in regional correlation of syn-tectonic strata, Colorado River extensional corridor, Geological Society of America Annual Meeting, St. Louis, MO.
- Beratan, K.K., 1988, Basin development during Tertiary detachment faulting, Whipple Mountains, southeastern California, Geological Society of America Centennial Meeting, Denver, CO.
- Nielson, J.E. and Beratan, K.K., 1988, Time of detachment faulting from Miocene sequences, Colorado River extended terrane, Geological Society of America Centennial Meeting, Denver, CO.
- Beratan, K.K., 1988, Tectonic implications of changes in sedimentation and volcanic style, Whipple Mountains, southeastern California, Geological Society of America Cordilleran Section Meeting, Las Vegas, NV.
- Beratan, K.K., 1987, Trace fossils in Miocene lacustrine and fluvial rocks, Whipple Mountains, southeastern California, Geological Society of America Cordilleran Section Meeting, Hilo, HI.
- Beratan, K.K., 1986, Sedimentary and volcanic rocks related to Miocene detachment faulting, Whipple Mountains, California, Geological Society of America Cordilleran Section Meeting, Los Angeles, CA.

**MICHAEL BIKERMAN****Articles:**

- Bikerman, M., Bell, K., and Card, J.W., (1992) Strontium and neodymium isotopic study of the western Mogollon-Datil volcanic region, New Mexico, USA; Contr. Min. Petr. 109, p. 459-470.

**DAVID K. BREZINSKI****Abstracts:**

Brezinski, D.K., 1992. Trilobites from the Permian of West Texas. Annual Meeting of the Geological Society of America, Cincinnati, v. 24, p. A97.

Brezinski, David, Campbell, Patricia, Anderson, Thomas H., 1992, Evidence for Detachment of the Cambro-Ordovician Carbonate Sequence in the Central Appalachians. Annual Meeting of the Geological Society of America, Cincinnati, v. 24, p. A147.

Campbell, P., Brezinski, D.K., and Anderson, T.H., 1992. Ductile Deformation zones along the west flank of the northern Blue Ridge. Abstract with Programs of the Northeast Section of the Geological Society of America, Harrisburg, v. 11, p. 11.

**JOHN L. CARTER****Articles:**

Carter, J.L., 1991, A new aulostegid (Brachlopora: Aulostegoidea) from the Lower Mississippian of northcentral Iowa: Annals of Carnegie Museum, 60(4): 359-363.

**MARY DAWSON****Articles:**

Dawson, Mary, 1991, High Arctic early Miocene vertebrates of Haughton Astrobleme (Abstract). Geological Association of Canada and Mineralogical Association of Canada Joint Annual Meeting, Program with abstracts, 16:A29.

Dawson, Mary, 1991, Plagiomenids and other mammals from the Eocene of Arctic Canada (Abstract). International Conference Monument Grube Messel - Perspectives and Relationships. Darmstadt, Germany.

**JACK DONAHUE****Articles:**

Watters, D., Donahue, J., and Stuckenrath, R., 1991, Paleoshorelines and the Prehistory of Barbuda, West Indies, In Johnson, L.L. and Stright, M. (Eds), Paleoshorelines and Prehistory: An Investigation of Method, pp. 15-52, Boca Raton, CRC Press.

Adovasio, J.M., Donahue, J., and Stuckenrath, R., 1992, Never Say Never Again: Some Thoughts on Could Haves and Might Have Beens. American Antiquity, 57, 327-331.

**Abstracts:**

Feuss, M.T., and Donahue, J., 1992, Post-Saladoid Age Pottery in the Northern Lesser antilles: Lessons Learned from Thin Section Petrography. Annual Meeting, Society American Archaeology, Pittsburgh, PA.

Duncan, R. and Donahue, J., 1992, Sediment Analysis and Paleoclimate, Danger Cave, Utah. Annual Meeting, Society American Archaeology, Pittsburgh, PA.

Donahue, Jack, 1992, Neotectonic Movement in the Southern Dead Sea Valley: Data From Four Early Bronze Archaeological Sites in Jordan, Abstracts with Programs Geological Society of America Annual Meeting, Cincinnati, Ohio, vol. 24, no. 7, p. A162.

**BRUCE W. HAPKE****Articles:**

Domingue, D., B. Hapke, G. Lockwood and D. Thompson, 1991. Europa's Phase Curve: Implications for Surface Structure. *Icarus*, 90, 30-42.

Hapke, B., D. Blewett, 1991. Regoliths of Icy Satellites: The Coherent Backscatter model. *Nature*, 352, 46-47.

**WILLIAM HARBERT****Refereed Journal Articles:**

Harbert, William, 1992, Paleomagnetic on-line data archive established, EOS Trans. AGU, v. 73, no. 6, p. 70.

**Films, Computer Animation:**

Harbert, William, 1992, Steens Mountain geomagnetic reversal: 6 minutes, captions in English, French and Russian.

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**Abstracts:**

Harbert, William, 1992, Paleomagnetic Data Available On-line, Institute for Rock Magnetism Newsletter, v. 1 no. 3, p. 1.

Helphetz, Alexander, and Harbert, William, 1992, Complex paleomagnetic features of the Jurassic ophiolites from NE Eurasia, EOS Trans. AGU, v. 73, Spring Meeting Suppl., p. 96.

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- Harbert, William, 1992, Paleomagnetic of southern Alaska: Reliability, interpretation and tectonostratigraphic terrane migration, International Conference on Arctic Margins (ICAM) Abstracts, p. 24.
- Harbert, William, J. Hillhouse, and T. Vaillier, 1992, Northern hemisphere formation of the Wallowa-Seven Devils terrain during the Permo-Carboniferous reversed bias superchron, International Conference on Arctic Margins (ICAM) Abstracts, p. 24.
- Didenko, Alexi, Harbert, William and Stavsky, A., 1992, Paleomagnetism of the Khatyrian and Maynisky terrains, Koryakian highlands northeast CIS, International Conference on Arctic Margins (ICAM) Abstracts, p. 24.
- Helphetz, Alexander, Harbert, William and L. Savostin, 1992, Paleomagnetism of the Olyutorsky terrain, northeast CIS, International Conference on Arctic Margins (ICAM) Abstracts, p. 25.

**EDWARD G. LIDIAC****Abstracts:**

- Jolly, W.T., Lidiac, E.G., and Wu, T., 1991, Origin of Puerto Rican Mesozoic shoshonites: evidence from incompatible lithophile element geochemistry: Geological Society of America Abstracts with Programs, v. 23, p. A442-A443.
- Lidiac, E.G., Gilbert, M.C., Hogan, J.A., Ahern, J., Young, R.A., Denison, R.E., Keller, G.R., Donovan, R.N., and Johnson, K.S., 1991, Drilling the southern Oklahoma aulacogen: EOS Transactions, American Geophysical Union, Fall Meeting.
- Gilbert, M.C., Hogan, J.A., Ahern, J., Weaver, B.L., Young, R.A., Lidiac, E. G., Denison, R.E., Keller, G.R., Donovan, R.N., and Johnson, K.S., 1992, How shallow drilling would clarify relations within the southern Oklahoma Alulacogen: Geological Society of America Abstracts with Programs, v. 24, p. 11.
- Lidiac, E.G., 1992, Geochemical and petrographic characteristics of intrusive igneous rocks, St. Croix, U.S. Virgin Islands (abs): 13th Caribbean Geological Conference Program and Abstracts, Pinar del Rio, Cuba, p. 137.
- Jolly, W.T., Lidiac, E.G., and Wu, T., 1992, Petrogenesis of late Cretaceous shoshonitic volcanics from central Puerto Rico (abs): 13th Caribbean Geological Conference Program and Abstracts, Pinar del Rio, Cuba, p. 138.
- Lidiac, E.G., 1992, Al-Fe epidote: indicator of grade of burial metamorphism in the volcanic sequence of east-central Puerto Rico (abs): 13th Caribbean Geological Conference Program and Abstracts, Pinar del Rio, Cuba, p. 139.

**Articles:**

- Lidiac, E.G., and Cecil, V.M., 1991. Authigenic K-Feldspar in the Precambrian basement of Ohio and its effect on tectonic discrimination of the granitic rocks: Canadian Journal of Earth Sciences, v. 28, p. 1624-1634.

**HAROLD B. ROLLINS**

**Articles:**

Hutchinson, P.J., H.B. Rollins, and R.S. Prezant. 1992. Detection of xenophobic response in the periostracum of the bivalve, Corbicula fluminea, through laser-induced mass spectrometry. Arch. Environmental Contamination and Toxicology.

Hutchinson, P. J., Rollins, H.B., Sharkey, A.G., Prezant, R.S., Kim, J., Hercules, D.M., 1992. A freshwater bioprobe: Periostracum of the Asian clam, Corbicula fluminea (Muller) combined with laser microprobe mass spectrometer. Environmental Pollution.

**Abstracts:**

Brindle, W.D., Rollins, H.B., and S.K.Kennedy, 1992. Morphological analysis of Fusulinacea from the Putnam Hill Limestone Member of the Allegheny Formation (Des Moinesian, Northern Appalachian Basin). G.S.A. Ann. Mtg., Cincinnati, poster session.

Rollins, H., R.S. Prezant, R.R. West, and R.B. Toll. 1992. Metapopulation dynamics: Potential constraints upon interpretation of fossil population structure and taphonomic gradients. Invited paper, NE GSA Mtg., Harrisburg, PA Absts. with Programs 24(3): 71.

Shaulis, J.R., and H.B. Rollins, 1992. Stratigraphy and depositional environments of the Pine Creek Interval (Conemaugh Group, Missourian), Youghiogheny River Lake, Fayette Co. and Somerset Co. PA. NE GSA Mtg., Harrisburg, PA, Absts with Programs 24(3):75.

Rollins, H.B., and U. Brand, 1992. Ancient ENSO events inferred by bivalve shell geochemistry: A critique. Soc. Amer. Archaeology, Absts. 57th Ann. Mtg., Pittsburgh, PA., pp. 108-9.

Zel, R.W., and H.B. Rollins, 1992. Marine intervals of Lower to Lower Middle Pennsylvanian ("Pottsville") rocks of the northern Appalachian Basin. Journ. Pennsylvanian Academy of Science, 65:205 (Abst.).

**VICTOR A. SCHMIDT**

**Abstracts:**

Sasowsky, I.D., Schmidt, V.A., White, W.B., 1992. Incision rates of headwater streams: Determination by paleomagnetic dating of clastic cave sediments in valley walls. GSA Abstracts with Programs 24(7), A121.

Pease, P. P., Gomez, B., Schmidt, V.A., 1992. Magnetostratigraphy of Cave Sediments, Wyandotte Ridge, Crawford County, Southern Indiana. GSA Abstracts with Programs 24(7), A48.

**ANDREW G. SHARKEY, JR.****Presentations:**

- Morsi, B.I., Chiang, S.H., Sharkey, A., and Blachere, J., "Surface Control In Selective Agglomeration for Advanced Physical Coal Cleaning," Proceedings of the Sixth Annual Coal Preparation, Utilization, and Environmental Control Contractors Conference, Pittsburgh, PA., August 1990.
- Kim, S., Ciocco, M., Morsi, B.I., Chiang, S.H., Cheng, Y.S., Sharkey, A., and Blachere, J., "Effects of Surface Modifications Reagents on the Performance of a Selective Agglomeration Process for Fine Coal Beneficiation," Proceedings of the Seventh Annual International Pittsburgh Coal Conference, Pittsburgh, PA, September, 1990.
- Morsi, B.I., Chiang, S.H., Sharkey, A., and Blachere, J., "Surface Control In Selective Agglomeration for Advanced Physical Coal Cleaning," Presented at the Seventh Annual Coal Preparation, Utilization, and Environmental Control Contractors Conference, Pittsburgh, PA, July, 1991.
- Hittle, L., Sharkey, A. G., Houalla, M., Hercules, D., and Morsi, B.I., "Determination of Sulfur Forms on Coal Surfaces by ESCA," proceedings of the Eighth Annual International Pittsburgh Coal Conference, Pittsburgh, PA, October 14-18, 1991.

**Articles:**

- Hutchinson, P. J., Rollins, H.B., Sharkey, A.G., Prezant, R.S., Kim, J., Hercules, D.M. A freshwater bioprobe: Perlostracum of the Asian clam, Corbicula fluminea (Muller) combined with laser microprobe mass spectrometer. Environmental Pollution, 1992.
- Kim, S., Morsi, B.I., Araujo, G., Chiang, S.H., Blachere, J., and Sharkey, A., "Effect of Grinding Conditions on the Performance of Selective Agglomeration Processes for Physical Coal Cleaning," Coal Preparation Journal, 9, 141, 1991.

**STUDENT PUBLICATIONS**

- Gerber, Dean, Kennedy, Stephen K., R.J. Lee Group, 1992, Laser Microprobe Analysis of Trace Element Composition in Quartz For Source Rock Determination, Abstracts with program Geological Society of America Annual Meeting, v. 24, no. 7, p. A60.
- Brindle, Wendy D., Rollins, Harold B. and Kennedy, Steven K., 1992, Morphological Analyses of Fusulinacea From The Putnam Hill Limestone Member of the Allegheny Formation (Des Moinesian, Northern Appalachian Basin), Abstracts with program Geological Society of America Annual Meeting, v. 24, no. 7, p. A75.

**Current Full Time Graduate Students**

Anderson, Robert  
Campbell, Patricia  
DeLillo, Nick  
DiMucci, Domenic  
Hakala, Katherine  
Elinski, William  
Evans, Timothy  
Helphetz, Alexander  
Hoadley, Mark  
Gerber, Dean  
Greenidge, Darius  
Kern, Christopher

Marshall, Leland  
McGuire, Audrey  
Peer, Brian  
Prellwitz, Henry  
Riley, Kevin  
Risek, Richard  
Storrick, Gary  
Traub-Metlay, Suzanne  
Venn, Cynthia  
Xu, Xi  
Zheng, Jiang-Yun

**Current Part Time Graduate Students**

Anderson, David  
Bitman, John  
Feather, Ralph  
Flaherty, Thomas  
Hutchinson, Peter  
Kendrick, Andrew  
Kyshakevych, Roman

Linsley, David  
McNaughton, Deborah  
Orient, Jeffrey  
Posney, Karen  
Uhren, Michael  
Welble, Deborah

**Current Undergraduate Geology Majors**

Ayres, Gregory A.  
Burzlo, James R.  
Cunningham, Thomas P., Jr.  
DeFlitch, Douglas A.  
Dietz, David M.  
Everitt, Wayne D.  
Frustaci, Stephen M.  
Hunsicker, Christopher M.  
Kearney, Rene A.  
Kohn, Michael P.  
McCafferey, Thomas V.  
McConnell, Amy S.

Mack, Peter W.  
Norris, Julie L. C.  
Rosenbaum, Jason F.  
Ryan, Andrea M.  
Sgourakis, Michael S.  
Sleffert, Brian G.  
Squire, William A.  
Werner, Christopher L.  
Wilson, Yvonne  
Wright, Robert D.

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**DOCTOR OF PHILOSOPHY OF SCIENCE DEGREE****BRINDLE, WENDY D.**

Morphological Analysis of  
Fusulinacea from the Putnam Hill  
Limestone Member of the Allegheny  
Formation (Des Moinesian), Northern  
Appalachian Basin.  
Thesis Advisor: Harold B. Rollins  
Graduated: August, 1992

**ZEI, ROBERT**

Marine Intervals of Lower to Middle  
Pennsylvanian ("Pottsville") Rocks of  
the Appalachian Basin.  
Thesis Advisor: Harold B. Rollins  
Graduated: December, 1991

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**MASTER OF SCIENCE DEGREE****ROWE, PATRICIA**

Environmental Variation in Shell  
Chemistry of the Hard Clam M.  
mercenaria) in a Georgia Salt Marsh  
Estuary.  
Thesis Advisor: Harold B. Rollins  
Graduated: April, 1992

**THAYER, CYNTHIA**

Archaeological Geology and  
Chemical Investigations at the  
Brigham Site: A Sequence of  
Holocene Deposition from Northern  
England.  
Thesis Advisor: Jack Donahue  
Graduated: December, 1990  
(Corrected from 1991 newsletter)

**ZAGORSKI, WILLIAM**

Modes of Local and Regional Traps  
of Hydrocarbons in the Lower  
Silurian Medina Sandstone Group  
Cooperstown Gas Field, Crawford  
and Venango Counties, Pennsylvania.  
Thesis Advisor: Thomas H. Anderson  
Graduated: December, 1991

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**BACHELOR OF SCIENCE DEGREES AWARDED APRIL, 1992**

DONNACHIE, CRAIG WILLIAM  
ILKHANIPOUR, KAYVAN  
LOLI, SIMON  
SCHULTZ, SANDRINE ANNE

**LAWRENCE J. ARTMAN, II** Ph.D. 1986

Larry and his wife Diane live in Verona, Pa., where he is employed by HDR Engineering, Inc. (formerly Richardson-Gordon & Associates). His position is a project engineering geologist responsible for subsurface exploration, geologic field mapping, and design of major highway and bridge foundation design projects.

**STEPHEN G. BURTELL** B.S. 1982  
M.S. 1989

Steve is living in Kuala Lumpur, Malaysia where he is affiliated with Fugro-McClelland (M) Sdn. Bhd. where he is a Resident Environmental Manager. His duties there are to manage land and marine environmental and geochemical investigations.

**ART GAZDIK** B.S. 1983

Art received his M.S. Civil Engineering from Pitt in 1991. His masters work involved the modeling of water distribution systems and pump stations. He is presently affiliated with Senate Engineering Company as a Project Engineer. He lives in Pittsburgh with his wife Deborah and son Jack.

**RICHARD E. GRAY** Graduate Study  
Geology 1958-1963

As Senior Vice President of GAI Consultants, Inc., Richard is Manager of Technical Services and lives in Greensburg, PA with his wife Audrey. His other accomplishments have been as Chairman, U.S. Committee for International Association of Engineering Geology and recipient, Distinguished Member Award, Society for Mining, Metallurgy, and Exploration, Pittsburgh Section.

The National Academy of Sciences-Natural Research Council recently appointed Dick one of their ten delegates to the 29th

International Geological Congress in Kyoto, Japan. Dick was nominated by the U.S. National Committee for Geology.

**BILL HAYWARD** B.S. 1979, M.S. 1982

Since October, 1990, Bill has been affiliated with Continental Reserves as a Geologist generating natural gas prospects primarily within the State of West Virginia. From 1981 to 1990 he worked for CNG Development Company as a prospect Geologist.

On a personal note, Bill was the Marching Band Director at Baldwin High School from 1988 to 1990, working evenings and weekends with the program while continuing to work days as a geologist for CNG. He stated music was always his hobby, so he gave directing a try until it became too time demanding. Actually taking 120 high school band members to Daytona Beach, Florida for a week long music festival pushed him over the edge. He retired from the position shortly after the trip and decided to spend his free time with his family (wife Linda and children Jennifer and Jessica) and his golf clubs.

**RICHARD K. LEE** M.S. 1979

Richard, his wife Carol and daughter Jessica live in Malvern, PA., where Rich is affiliated with Quantum Geophysics, Inc. His position is President and Principal Geophysicist where his duties are marketing, proposal writing, contract negotiation, and managing/conducting geophysical surveys in support of engineering, groundwater, and environmental studies.

**STEVE MASTOVICH**

B.S. 1978

Steve and his wife Susan live in the Durham, NC area where Steve is a Geologist for the Blue Ridge Environmental Services, Inc. There he conducts environmental investigations and develops and implements remedial action solutions, primarily at UST sites. Susan is in the 4th year of a 5 year medical residency program at Duke University. Pathology is her specialty.

**STANLEY R. MICHALSKI**

B.S. 1967

Resource Mgmt. M.A. 1975

Another graduate with GAI Consultants, Inc., in Pittsburgh is Stanley. He and his wife Sally have three children, Michael, Ann-Marie and Mark. Stanley is a Senior Staff Geologist doing environmental studies; ground water assessment; underground coal mine fires on abandoned mine lands. He was also principal investigator-Centralia Mine Fire and Glen Burn Mine Fire. He sends news on Lawrence J. Winschel, a 1970 graduate, who started his own consulting business in 1992 called Pennsylvania Soil and Rock, Inc., located in Pittsburgh.

**EL-EMAM MOHAMED**

M.Sc. 1983

El-Emam is presently Seismic Data Processing Manager for the General Petroleum Company in Cairo, Egypt. There he is the supervisor of seismic data processing and interpretation. From 1985 to 1990 he was a project manager for a basin evaluation project funded by the U.S. AID. He is married and has two children, Yara and Hagger.

**TIMOTHY M. MURIN**

M.S. 1988

Timothy, Kathryn and their two daughters live in Upper St. Clair, Pa. where he is Vice President, Exploration and Operations for Castle Exploration Company, Inc. There he manages geology, land and engineering for petroleum prospects in Pennsylvania, Alabama and Oklahoma.

**HENRY L. POLLAK**

Ph.D. 1972

Henry is an independent scientist at the University of California in Santa Barbara, California doing research in fundamental structures of irreversible processes of macroscopic physics.

**MARK W. ROBERTSON**

B.S. 1982

Mark and Michelle live in Orlando, Florida where he is affiliated with Engineering Science, Inc. There he conducts contamination assessments of soil and groundwater in accordance with state and federal regulations. He is also a licensed Professional Geologist in the state of Florida.

**NANCY TAYLOR**

B.S. 1985

Nancy, Staff Geologist, Pittsburgh District, Army corps of Engineers, is busy coordinating the completion of a Phase I environmental assessment for the Johnstown (PA) Flood Control Rehabilitation Project.

**1992 January**

- 09 Michael Bikerman, University of Pittsburgh, Dept. of Geology & Planetary Science, Semester at Sea
- 16 Robert Turka, GAI Consultants, Site Assessments
- 23 A. Helphetz, University of Pittsburgh, Dept. of Geology & Planetary Science, Results of Paleomag of Koryakia Jurassic Ophiolites and S. Lieberman, University of Pittsburgh, Dept. of Geology & Planetary Science, The Regularities in Olistostrome's formation in Batenevsky Range Region (Central Siberia)
- 30 Kathi Beratan, University of Pittsburgh, Dept. of Geology & Planetary Science, Testing Tectonic Models with Synextensional Deposits: An Example From the Whipple Detachment System, Southeastern California

**1992 February**

- 06 Darius Greenidge, University of Pittsburgh, Dept. of Geology & Planetary Science, Comparison of Thermal Bleaching of Aluminum Trapped-Hole Centers in Topaz and Quartz
- 13 Mary Roden, Rensselaer Polytechnic Institute, Department of Earth and Environmental Services, Thermal History of the Hartford, Deerfield, Newark and Taylorsville Basins Using Apatite and Zircon Fission-Track Analysis
- 20 Phillip J. Glogowski, GAI Consultants, East St. Expressway Fly-Ash Fill
- 27 Kim Klitgord, Woods Hole, MA, Dept. of Geology and Geophysics, Plate Tectonics - Opening of the Central Atlantic

**1992 March**

- 05 Jim Teeter, University of Akron, Dept. of Geology, Saline Lake History, San Salvador, Bahamas
- 12 Spring Break - No Seminar
- 19 Annabelle Foos, University of Akron, Dept. of Geology, Bahamian Soils: A Modern Analogue to Paleozoic Sub-Aerial Exposure Surfaces
- 26 Richard E. Gray, GAI Consultants, Engineering Geology in the Appalachians



**1992 April**

- 02 Robert J. Houston, GAI Consultants, New Wetland Regulations, State & Federal
- 09 Lawrence Gochioco, Consolidation Coal, High Resolution Seismic Reflection Profiling for US Exploration and Mine Planning
- 14 John David Crawford, University of Pittsburgh, Physics and Astronomy Department, Aspects of Chaos

**1992, August**

- 12 Patricia Rowe, University of Pittsburgh, Environmental Variation In Shell Chemistry of the Hard Clam Mercenaria mercenaria in a Georgia Salt Marsh Estuary

**1992 September**

- 03 Welcome & Introduction – Thomas H. Anderson, Chairman
- 10 Dr. Bruce Hapke, University of Pittsburgh, Department of Geology & Planetary Science, Coherent Backscatter In the Solar System.
- 17 Peter Hutchinson, Xenobiotic Detection and Remediation of the Asian Clam, Corbicula Fluminea
- 24 Lance Lugar, University of Pittsburgh, Problems In the Evolutionary Morphology of Shell and Aperture Shape in 3 Species from the Pleistocene of San Nicolas Island

**1992 October**

- 03 Karen Cohen, U.S. Bureau of Mines, Environmental and Engineering Problems of Abandoned Metal Mining Communities In Northern New Jersey Addressed with Computer Database and Mapping Technology
- 08 Jim Castle, Cabot Oil and Gas Corp., Sequence Stratigraphy and Depositional Systems of the lower Silurian Medina Group – North Appalachian Basin
- 15 Stephen Farber, University of Pittsburgh, Environmental Policy – Development and Application
- 22 Daniel May, Findley College, Division of Natural Sciences, Late Cretaceous Deformation of the Crust in Southern California
- 29 Dr. William Harbert, University of Pittsburgh, Department of Geology & Planetary Science, Paleomagnetism and Plate Tectonics and Remote Sensing from the Region of Northeastern Russia

### 1992 November

- 05 Katharine Hakala, University of Pittsburgh, Department of Geology & Planetary Science, Terrestrial Vegetation and Climate during the Pleistocene: The Evidence from Long Cores
- 12 Dr. John M. Armentrout, AAPG 1992-93 Distinguished Lecture, In Stratigraphic Analysis, the Present is the Key to Less Than 25% of the Past: How Do I Reconstruct Paleogeographic Maps for the Remaining 25%?
- 19 Dr. Edward Lidlak, The University of Pittsburgh, Department of Geology and Planetary Science, Origin of Mesozoic Puerto Rican Shoshonites
- 26 No Seminar

### 1992 December

- 03 Dr. Ronald D. Neufeld, Professor of Civil Engineering, Environmental Engineer, University of Pittsburgh, Environmental Engineering
- 10 Kristine Uhlman, ICF Kalsor Engineers, Technical Director, Hydrogeology, Tritium Age Determinations and Evaluation of Groundwater Contamination
- 19 No Seminar

### **Sigma Gama Epsilon -Beta Chapter**

With the beginning of a new academic year, Sigma Gamma Epsilon (SGE), membership has dropped slightly. We hope this year's activities will hopefully rekindle interest. For the first time in several years, SGE is sponsoring geological field trips. A fossil collecting trip to southwestern Ohio in early October was a big success. Rich Risek (who has just transferred from the chapter at the University of Toledo) has organized a one-day field trip in early January to a coal mine in the Pittsburgh area. A date will be announced at the beginning of the Spring Semester, and all are welcome. Contact Rich for more details (201 Thaw, 624-9324). During Spring Break SGE and the Geology Club are considering a trip to the Four Corners. Again, all are welcome. Ideas or interests for field trips from faculty and students are gladly welcomed. Contact Tim Evans (211 Thaw, 624-9324).

Fund raising activities are also keeping SGE members busy. Once again this year, SGE is selling rock kits to the Geology 0800 classes. Syria Mosque block sales were a huge success and have been continued again this year. (Orders for Christmas can be made!) Department T-shirts are in the works; and, Army surplus Brunton compasses should be available soon.

For a philanthropic activity, our chapter supplied a chapter in Louisiana with samples of Pottsville Sandstone to be used in high school earth science classes. We hope to collect plant fossils from the area soon and send them also. SGE at the University of Pittsburgh is alive and a buzz with activity!!

- Tim Evans, President

### **Syria Mosque (1916-1991)**

The venerable Syria Mosque, an Oakland landmark, was finally demolished in September, 1991. Some of the members in the Beta Chapter of Sigma Gamma Epsilon saw a unique fund-raising scheme in the piles of marble, serpentine, and granite that were being salvaged by the demolition contractors. Samples of each rock variety were collected, and made into souvenir paperweights. This fundraiser benefitted the newly established Department of Geology and Planetary Sciences Major Equipment Fund.

Each piece was cut and polished, and a metal plaque engraved with "Syria Mosque, 1916-1991" was affixed on the top of the paperweight.

This is the first time, that we are aware, that a Geology Department fundraiser started with such a unique idea.

Blocks can still be purchased! Please use the enclosed order form or contact Cindy Venn @ (412) 624-0490 or Henry Prellwitz @ (412) 624-9320.

### SYRIA MOSQUE, 1916-1992

This is your chance to obtain a unique souvenir of the recently demolished Syria Mosque. Complimentary paperweights prepared from interior stonework are available with a donation to our newly established Department of Geology and Planetary Science Major Equipment Fund at the University of Pittsburgh. Each piece is cut and polished, and a metal plaque engraved with "Syria Mosque, 1916-1991" is centered on the top of the paperweight. The bottom of each paperweight has felt pads to prevent damage to desk tops.

<u>ROCK TYPE &amp; APPROXIMATE SIZE</u>	<u>AVAILABLE FOR</u>	<u>CHOICE</u>
<u>A DONATION OF:</u>		
Limestone (contains fossils)		
2"x4"x1 .....	\$ 15.00	_____
3"x5"x2" .....	20.00	_____
Serpentine (green with white veins)		
1.5"x3"x0.75" .....	15.00	_____
3"x3"x0.75" .....	20.00	_____
Pink Granite Slabs (polished top, rough edges)		
sizes vary, max. size 5"x7" .....	2.00/sq.in.	
Size desired _____		_____

LIMITED QUANTITIES AVAILABLE (ESPECIALLY OF SERPENTINE). ORDER EARLY TO ASSURE SATISFACTION. Indicate a second & third choice in case the supply of your first choice has been depleted.

Checks for donations (tax deductible) should be made out to the University of Pittsburgh, with the Dept. of Geology & Planetary Science Major Equipment Fund noted in the memo blank of the check. Remember that your company may also have matching funds available.

NOTE: Custom orders (bookends, larger blocks, etc.) may be ordered at a negotiated price. Contact Henry Prellwitz at (412) 624-9320 or Cindy Venn at (412) 624-0490.

To place your order, indicate your choice by number in the blanks above and fill out your name, address & phone on the opposite side of this form. If you order a granite slab, be sure to indicate the approximate size desired in the blank above. Enclose this form with your check.

### Banquet News

Just in time for the presses, the date and time has arrived! Keep your calendar open and dated for Friday, April 2 at 6:30 p.m. The place is the Faculty Club. We hope to see you there. Call Cindy Venn for reservations at (412) 624-0490.

### Christmas Party

The Christmas party was held Friday, December 11th from 5 until 9 p.m. in 203 Thaw Hall and the museum area outside the classroom. There was a good turnout of faculty and students. There's never a problem of having too much food, especially because this was the Friday before finals weekend. Any leftovers went into the student lounge refrigerator and were used to give sustenance to long studying undergrads.

### Geology Picnic

The fall picnic was held on Wednesday, September 30th at the Schenley Park Vietnam Veteran's Pavilion from 4 to 10 p.m. The day was chilly but it didn't rain! The faculty tried to whip up a challenge softball game with the students but after a few short innings a bunch of nine-year-old soccer players ousted them from the field. Other than softball, frisbee and foxtail throwing were the only other activities other than eating and drinking. If you're interested in attending next year's picnic, call us at 624-8780 in early September for the date.

### Geology Club 1992

DeFLITCH, Douglas  
SGOURAKIS, Michael  
McCONNELL, Amy  
RYAN, Andrea

PRESIDENT  
VICE PRESIDENT  
TREASURER  
BUSINESS MANAGER

The "Outstanding Service Award" was presented to Jack Sharkey for outstanding contribution, service and dedication to Chemistry undergraduates and undergraduate Chemistry programs. The award was presented by the American Chemical Society — Student Affiliates on April 8, 1992.

### **THE 1992 PITTSBURGH AWARD TO PROFESSOR JACK SHARKEY**

Jack Sharkey is the recipient of the 1992 Pittsburgh Award. This is awarded by the Pittsburgh Section of the American Chemical Society to recognize Pittsburgh chemists who have made outstanding contributions to the profession within Pittsburgh. Jack's receipt of this award is a very appropriate recognition of his contributions over a long career, including his many years of service at the Department of Energy and his so-called retirement at Pitt during which he is making vital contributions to both teaching and research in the Geology Department and in the Chemistry Department. The award was presented to Jack at a dinner at Duquesne University on October 29.

#### **The Pittsburgh Award (From the Section's Bylaws)**

Recognizing its leadership in chemical affairs in the community, The Pittsburgh Section of the American Chemical Society in 1932 established the Pittsburgh Award. This Award symbolizes the honor and appreciation accorded to those who have rendered distinguished service to chemistry in this community.

Members of the Pittsburgh Section, or in exceptional cases, non-members, who have done work worthy of note toward increasing chemical knowledge, promoting industry, benefiting humanity or advancing the Pittsburgh Section, shall be eligible for consideration.

A.G. (Jack) Sharkey, Jr. attended the College of Wooster, Case Institute of Technology, and the University of Pittsburgh. He is currently Research Professor in the Department of Geology and Planetary Science and a member of the Research Faculty of the Surface Science Center, both at the University of Pittsburgh. His current research is the investigation of oxidized coal surfaces using surface analysis techniques including laser mass spectrometry. From 1978 to 1985, he was Deputy Director of the Pittsburgh Energy Technology Center, the largest Fossil Energy Research Center operated by the federal government. He joined what was then the U.S. Bureau of Mines in 1946 and was associated with the Bruceton, Pennsylvania laboratory during its transition to ERDA in 1974 and to the Department of Energy in 1977.

Jack's major research interest at PETC and its predecessors was the application of spectral analysis techniques to coal and coal-derived fuels. He has more than 200 publications to his credit, most of them in the field of mass spectrometry and including investigations of coal, coal extracts, and coal gasification and liquefaction products. As an Adjunct Faculty member of the University of Pittsburgh, Jack taught the first graduate level mass spectrometry course in the country starting in 1964. He has had students from many departments at the university and from major industrial research laboratories in the area. He received the Department of Interior Distinguished Service Award in 1970, the Department of Energy Distinguished Career Service Award in 1985, both the highest awards given by the departments. Jack is a Past Chairman of the Pittsburgh Conference on Analytical Chemistry and Applied Spectrometry and of the Spectroscopy Society of Pittsburgh.

The Society for Mining, Metallurgy and Exploration, A Member Society of The American Institute of Mining, Metallurgical and Petroleum Engineers is proud to announce **Maurice Deul** as a Distinguished Member in recognition of and appreciation for outstanding service to the Minerals Industry and to the Society.

### **Concrete-Filled Tires – a Novel Advanced Crib System**

On September 1, 1992 **Morry** was awarded a United States Patent #5,143,484 for Mine Cribbing Device and Method. Discarded truck and automobile tires, filled with concrete are the basic elements for building these innovative roof support cribs in mines.

To date, two sizes of concrete-filled tire cribs have been tested at the U.S. Bureau of Mines Mine Roof Simulator (MRS) at Bruceton: 20 inch truck tires and 14 inch passenger car tires. The 20 inch tires are the more common tire sizes for 18 wheel tractor-trailers and the 14 inch tires are the more common passenger car tire sizes.

Testing has shown that these cribs provide high compressive strength, comparable to concrete cribs, with the resilience and continuous support properties of wood cribs.

Tests were conducted with the MRS programmed to converge the lower platen with the upper platen at the rate of 0.2 inch/minute to a maximum convergence of 20 inches.

The initial yields for the 20 inch tire cribs ranged between 500,000 and 600,000 pounds of pressure and between 200,000 and 300,000 pounds of pressure for the 14 inch cribs. After 20 inches of total convergence the cribs were still supporting load; in some instances even more load than upon initial deformation.

The unique advantages of the concrete-filled tire cribs are:

- # high initial strength
- # no catastrophic failure
- # audible warning when the concrete cracks after the crib takes high load
- # resilience and stability under extreme convergence
- # simple installation : no wood, fiber or rubber separators are needed
- # no need for fiber reinforced concrete
- # can be banded together in multiples for easy handling

Another method of installing tire cribs is to stack tire casings to the roof, topping the stack with 2 boards and wedging them, then filling the stack completely with a mixture of crushed washery waste, fly-ash, and portland cement. Such cribs can be constructed easily, are low cost, use no large amounts of scarce timber, and can reduce the cost of disposing of washery waste and fly-ash. Tests using cribs constructed in this manner showed them to behave just as well as other stacked concrete filled tires.

**Michael P. Kohn** won the Conoco Corporation Field Course Scholarship for the Pennsylvania-YBRA Summer Field Course at Red Lodge, Montana, this summer.

The 1991 AAPG Eastern Section Annual Meeting awarded persons who have made special contribution to the profession. **William G. Zagorski** was honored with the Vincent E. Nelson Memorial Award for the best poster presentation.

**Darius Greenidge** is the recipient of an American Geological Institute Minority Geoscience Scholarship (AGI-MPP) for the 1992-93 academic year. Award recipients are geoscience majors who are U.S. citizens and members of ethnic minority groups that are under represented in the geosciences. These individuals are perceived by the AGI-MPP Advisory Committee as having particular potential for success in the geoscience profession.



**MEMORIAL OF****DR. ALVIN J. COHEN**

Alvin J. Cohen passed away on October 2, 1991. At the time of his death he was Professor Emeritus in the Department of Geology and Planetary Science of the University of Pittsburgh.

Alvin Cohen was born in Louisville, KY in 1918. During world war II he served as a commissioned officer in the U.S. Navy. He obtained his B.S. from the University of Florida and his Ph.D. from the University of Illinois, both in chemistry. He did post-doctoral research at the California Institute of Technology, was a senior fellow at the Mellon Institute, which is now part of Carnegie-Mellon University. In 1963 he joined the faculty of the University of Pittsburgh, where he remained until his death. He was also a research associate of the Carnegie Museum of Natural History.

His interests were catholic and ranged from ceramics and Eskimo carvings to German wines and antique Japanese prints. He was an internationally recognized authority in the field of color centers in minerals and glasses. He developed photo-darkening glass, for which he received an award from Industrial Research in 1963 for one of the 100 most significant technical products of the year. He was one of the first persons to recognize tektites as a product of giant meteorite impacts on the Earth's crust and that the mineral coesite could be a marker for such events. He was a Principal Investigator for spectral studies of Apollo lunar samples.

He was a fellow of several societies, including the American Association for the Advancement of Science, the Mineralogical Society of America and the Meteoritical Society, and was a member of the International Association of Geochemistry and Cosmochemistry and of the Mineralogical Society of Great Britain and Ireland.

The family of Dr. Cohen has suggested that donations in memory of Dr. Cohen be made to the Department of Geology and Planetary Science for support of students conducting basic research in fields close to Alvin's interests.

————— Bruce Hapke

**JOHN T. GALEY**

Sidney Powers medalist and Appalachian Basin geologist John T. Galey, 88, died at a Latrobe, Pennsylvania hospital on May 5, 1992.

The Independent producer discovered the first Oriskany sandstone gas production in western Pennsylvania in 1935, three years after graduating from Princeton with a bachelor's degree. He also found the first Oriskany gas east of the structural front in Pennsylvania in 1953.

In addition to his work in Pennsylvania, he enjoyed exploration success in West Virginia, Virginia and Ohio.

Galey came from an oil family, with his great uncle drilling the Maple Shade gusher near Pleasantville, Pa., in 1860 shortly after Drake's Titusville discovery. His great-uncle also drilled the Matthews gusher in Washington County, PA., that flowed 18,000 barrels a day; drilled another well in 1884 that proved the value of the anticlinal theory; and set the location for the Spindletop well in East Texas.

A founder of the Pittsburgh Geological Society, Galey was a key figure in creating AAPG's Eastern Section, serving as the group's first president in 1970-72. He received AAPG's Distinguished Service Award in 1974, Honorary Membership in 1980 and in 1990 was the first Powers medalist from the Eastern Section.

**HENRY LEIGHTON****MEMORIAL SCHOLARSHIP FUND**

Professor Henry Leighton (1884-1963) was a faculty member in the Department of Geology at the University of Pittsburgh from 1910 until his retirement in 1949. He served as Acting Chairman of the Department from 1928 to 1930 and as Chairman from 1931 to 1945. He obtained an A. B. degree from Cornell in 1906, and was an instructor at Cornell from 1906 to 1908 and an Assistant Economic Geologist with the New York State Museum from 1907 to 1910. He made numerous professional contributions to the Geology of Pennsylvania in Carboniferous stratigraphy, economic geology, geology of clays, history of the clay-working industry, and the geology of gypsum deposits. He was a Fellow of the Geological Society of America, and a member of the American Association for the Advancement of Science, Sigma Hi, the Pennsylvania Academy of Sciences, and the Society of Economic Geologists, of which he was a charter member.

The scholarship is being established in response to a contribution from Professor Leighton's daughter, Helen Leighton Canon. Mrs. Canon requests that a permanent graduate scholarship fund be established and that the scholarship be awarded on the basis of merit and need.

**THE NORMAN K. FLINT****MEMORIAL FIELD GEOLOGY FUND**

Good geologic training requires careful attention not only to lecture and laboratory work but also to field studies. The excitement of discovery that comes from field observations in the formative years is a stimulating and highly satisfying aspect of the science. Both modern and classic geologic problems require an adequate understanding of geologic field relations.

Almost every geology student at Pitt has had the opportunity to study important field concepts under Norm Flint's guidance. Throughout Norm's 35 year tenure he has constantly and enthusiastically emphasized the importance of field training to student geologists.

In Appreciation and Recognition  
of Devoted and Inspiring Teaching  
in the Field and in the Classroom  
His Students, Friends, and Colleagues  
Have Established in His Honor  
the Norman K. Flint Memorial Field Geology Fund

Department of Geology and Planetary Science  
University of Pittsburgh  
Pittsburgh, Pennsylvania 15260

Contributions are gratefully appreciated  
and will be acknowledged.

**FUND RAISING CAMPAIGN**

Your favorite Geology and Planetary Science department is continuing to improve its performance in its teaching, research and public service missions. However, improvement is costly and only some areas are adequately funded. We are certain that continued improvements in all areas are in the best interests of our alumni, students and friends, and to that end we invite your support. Some contributions have already been received for either specific departmental funds (see list below) or for unrestricted departmental use, and the needs are still large. We appreciate the continuing support of the alumni. Incidentally as you may know, many companies match employee gifts - some double or even triple them, so if in doubt check with your personnel office. Contributions may be sent directly to the Department, or, if you prefer, they may be sent to the University of Pittsburgh as part of the University's annual fund campaign. If you choose the latter method and want the contribution ear-marked for the Department, then you must specify that the funds are for the Department of Geology and Planetary Science. All contributions are tax-exempt and will be acknowledged.

If you wish to contribute, (1) please indicate on the form below to which fund you wish to contribute, (2) fill in name and address, (3) cut form along dashed line, and (4) return form and contribution to Ms. Candy Weller, Department of Geology and Planetary Science, 321 Engineering Hall, University of Pittsburgh, Pittsburgh, PA 15260.

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\_\_\_\_\_ Norman K. Flint Memorial Field Geology Fund

\_\_\_\_\_ Frances Dilworth Lidiak Memorial Fund

\_\_\_\_\_ Alvin J. Cohen Memorial Fund

\_\_\_\_\_ Henry Leighton Memorial Fund

\_\_\_\_\_ Departmental Field Vehicle Fund

\_\_\_\_\_ Unrestricted Departmental Gifts Fund

\_\_\_\_\_ Other (please specify) \_\_\_\_\_

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NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

AMOUNT \_\_\_\_\_

## Contributor's List

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We would like to thank the below mentioned contributors to these funds. Your support is greatly appreciated and will be used well.

If there are any questions, or concerns, please contact either Candy Weller at (412) 624-8784 or Thomas Anderson at (412) 624-8783.

### Norman K. Flint Memorial Field Geology Fund

Cooley, William A.  
Carothers, Marshall  
Flint, Margaret  
Groff, Donald  
Kaktins, Teresa  
O'Connor, Joyce  
Sarg, Frederick

### Unrestricted Gifts

Anderson, Thomas H.  
Brown, Joseph  
Busch, Richard  
Carter, John  
Doney, Hugh Holt  
Garrow, Mary  
Gray, Richard E.  
Hapke, Bruce  
Harper, John  
Heinecke, Thomas A.  
Hoffacker, Ben F.  
Kowalik, William S.  
Murin, Timothy  
Myers, Phyllis Burger  
Naplecek, Gerald L.  
Nolan, Kenneth M.  
O'Neill, Caron E.  
Peters, Douglas Cameron  
Pillant, Walter  
Robison, Mary Schlichte  
Sharkey, Jack  
Swanson, Roy I.

### Thermoluminescence Laboratory

Cassidy, Beverly

### Frances D. Udiak Memorial Fund

Cain, Bruce  
Kaktins, Teresa

### Alvin J. Cohen Memorial Fund

Martin, Carol H.  
Wagner, Jeffrey K.

### Henry Leighton Memorial Scholarship Fund

Cannon, Helen L.

### Vehicle Fund

Cain, Bruce  
Groff, Donald  
Kaktins, Teresa

### Major Equipment Fund

Cassidy, Beverly  
Hartman, Robert  
Sigma Gamma Epsilon

## **Alumni Response Form**

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### **ALUMNI RESPONSE FORM**

We ask you to complete this form so that in the next Newsletter we can include your news in the "Alumni News" section. Thanks.

NAME \_\_\_\_\_ DEGREE \_\_\_\_\_ YEAR \_\_\_\_\_

ADDRESS \_\_\_\_\_

SPOUSE'S NAME \_\_\_\_\_

NAMES AND AGES OF CHILDREN \_\_\_\_\_

COMPANY YOU ARE AFFILIATED WITH:

\_\_\_\_\_

YOUR POSITION, TITLE, ETC.

\_\_\_\_\_

YOUR DUTIES \_\_\_\_\_

\_\_\_\_\_

OTHER ITEMS OF POTENTIAL INTEREST TO CLASSMATES:

\_\_\_\_\_

ANY INFORMATION ON OTHER DEPARTMENTAL GRADS?

\_\_\_\_\_

\_\_\_\_\_

Please return to:  
Mrs. Rochelle Chesterpal  
321 Engineering Hall  
University of Pittsburgh  
Pittsburgh, Pennsylvania 15260