

Emeritus Faculty News 2006

Charlie Bentley

Ice Coring and Drilling Services (ICDS, a unit of the Space Science and Engineering Center across the courtyard from Weeks) continues to be my main activity. ICDS has now nearly completed construction of the new “Deep Ice Sheet Coring” (“DISC”) drill, aided immeasurably by help from **Lee Powell** and **Neal Lord**, some of whose time was most generously made available to us by the Department. We tested the complete drill in Greenland last summer, with outstanding success. The DISC produces unbroken core of beautiful quality, even in the brittle ice zone. Antarctic drilling will commence at the WAIS Divide site next austral summer.

A particular highlight of the year for me was to attend the International Glaciological Society’s International Symposium on Cryospheric Indicators of Global Climate Change, in Cambridge in August, because **Richard Alley**, the Evan Pugh professor of geosciences at Pennsylvania State University, was awarded the Seligman Crystal by the IGS. He received the award for “his prodigious contribution to our understanding of the stability of the ice sheets and glaciers of Antarctica and Greenland, and of erosion and sedimentation by this moving ice. Through the interpretation of paleoclimatic records from ice cores, Alley has examined their response to past and future climate change. He has provided evidence that large, abrupt global climate changes have occurred repeatedly in the Earth’s history and has contributed to our understanding of the driving mechanisms of these changes.”

As most of my readers will know, the Seligman Crystal, “is awarded from time to time to one who has made an outstanding scientific contribution to glaciology so that the subject is now enriched.” In the 43 years since the award was first presented in 1963, only 28 people have received the award.

With the International Polar Year 2007-08 nearly upon us, there has been a resurgence of interest in the IGY, now just 50 years old. As an IGY veteran, I have been asked to give no less than 4 talks on the IGY (I gave two in December at the fall AGU meeting in San Francisco—two are still in the future). That is just about the same as the total number as I have been asked to give since the IGY! It’s all very well to be recognized for longevity, but I find what’s going on now much more interesting.

For example—some of you may remember that Lee Powell and Neal Lord spotted a heavily crevassed oval region in the lower part of Whillans Ice Stream that had not been there in previous seasons. We wondered about it, but didn’t have the resources to investigate further. Now it turns out to have been caused by one of several lakes under the ice stream that fill and drain again on a time scale of months! (Helen Fricker of UCSD found the evidence from ICESat laser altimeter data—a paper should appear soon in Science.) Now that’s exciting!

Nikolas Christensen

2006 marked my third year as an Emeritus Professor. During the spring semester I spent part of the time in the San Juan Islands of Washington State working on the petrology and seismic structure of the Fidalgo Island Arc. For recreation I’ve taken up sea kayaking, as well as continuing my interests in golfing and hiking. In addition, I traveled twice to Taiwan to participate in research recently funded by the Continental Dynamics Program of NSF. Taiwan is the result of the most active arc-continent collision in the world (uplift of 3 cm/year and convergence up to 8 cm/year). The project, which is funded to 2010, involves collaboration from six US institutions as well as collaboration and support from Taiwanese and Japanese scientists. Broadband regional seismic and teleseismic recording, onshore-offshore and land refraction- reflection seismic transects, magnetotelluric sounding, petrophysics and gravity modeling are being used to study the Taiwan orogeny and test conceptual models for mountain building and crustal formation involving arc accretion.

In the fall semester I spent much my time in Madison working on physical properties of Taiwan rocks, as well as on two other research programs supported by NSF’s Continental Dynamics and Geophysics programs. These include studies of seismic anisotropy in Nanga Parbat, Northwest Pakistan, with Anne Meltzer and David Okaya and a geophysical study of an exposed crustal section of an early Jurassic Island Arc in South Central Alaska.

During the year I managed to complete two manuscripts—one on seismic properties of New Zealand rocks and the other on fore arc serpentinization. In December I attended the fall American Geophysical Union meeting and presented an invited paper titled “The Nature of Crustal Seismic Anisotropy: Constraints from Field and Rock Physics Observations.”



Displaced railroad tracks resulting from the 1999 magnitude 7.5 Chi-Chi earthquake. Nik took this photograph spring 2006 when he was doing fieldwork in Taiwan.

Dave Clark

It appears that the Department continues to grow stronger even without those of us who devoted so much of our professional lives to see this happen. The list of accomplishments of the current faculty and staff as well as the students who worked with me are a source of personal pride as they must be for anyone who was associated with the Department. From the sidelines it has meaning to sing "On Wisconsin—Geology and Geophysics Department."

During 2006, I was honored with an "Outstanding Alumnus Award" from my old department at BYU and I continue to be asked to review research projects as well as manuscripts related to both the Arctic Ocean and conodonts. I'm sorry that the Arctic ice-cover is melting in spite of my 1967 to 1987 claims that the ice was in equilibrium. Professor Untersteiner at the University of Washington assures me that we were right when the claims were made so perhaps it is the heat generated by those unhappy with the current administration in Washington that is responsible for the warming.

C.S. Clay

Last year music was more rewarding than gliding on metastable states. In summer music festivals, Jane and I played our instruments, clarinet and trombone and baritone. We played at the Moravian Music Festival in Columbus OH. Four weeks later, we went to the New Horizons Music gathering at Interlocken MI. This was an international event. New Horizons music ensembles are special because they are created for people over 50 years old and who have competence with their instruments at all levels.

In the September, we visited our daughter, Jo, a new assistant professor at Washington State University in Pullman, WA. She is teaching math teachers how to teach math. I visited the engineering department and gave a seminar on analyzing historical climate data. Most climate data are non-equally spaced time samples of temperatures and transformations to equally spaced samples were needed. I derived numerical Fourier expressions for spectral analysis and then showed how to compute equally spaced samples in the time domain.

Later in the fall I used these notes for a paper in the Physics Department's Chaos Seminar. The title was "Climate predictions: Sine waves and fractals." I showed how spectrum analysis of climate data $g(t)$ can be made using a digital-finite form of the infinite Fourier integrals. My MatLab analysis can handle non-uniformly spaced data points in a finite duration of time (not a Fast Fourier Transform or FFT). The spectra $G(f)$ are complex because the signals are real. Since fractal analysis is usually done on equally sampled time series, the inverse integral Fourier transformation of $G(f)$ was used to create sets of equally spaced $egg(t)$ for data comparisons in time domain and fractal analysis.

Unequally spaced $g(t)$ from Antarctic Dome C ice cores are an example. For the last half million years, these $g(t)$ show that peaks or warm conditions last roughly 12 ky and have approximately 100 ky separations. Spectral analysis of the $g(t)$ gives spectral peaks at 100 ky, 41 ky, and several in the 23 to 19 ky range. The periods of these spectral peaks are ~Milankovitch. First, Fourier transformation of these

peak $G(f)$'s to time gave a climate simulation in which the insolation is going down. Next, the full set of $G(f)$ were transformed to equally spaced $egg(t)$. Fractal analysis of $egg(t)$ has shown that the climate is fractal for periods less than 20 ky. Over the years, **Richard Alley**, **Lou Maher**, and John Young and I have had climate conversations. Recently, John Kutzbach and I reviewed climate history and W.F. Ruddiman's paper, "How did humans first alter global climate" [Sci. Am. March, 46-53 (2005)]. While the insolation has decreased to the earlier glacial levels, the humans are keeping the climate warm and even making it hotter. In 1972, geophysics students **Tze-Kong Kan** and **Jon Berkson** and I measured Arctic sea thicknesses of 2 to 3 meters. Now, the Arctic sea ice is melting and less than a meter thick. These facts seem very significant to me.

Robert H. Dott, Jr.

The Emeritus life continued to satisfy during 2006. My chief professional activity was overseeing the completion of the editing and production of *Bushels of Fossils*, the biography of **Professor Lowell R. Laudon** (1905-1993) (see page 30). I also published a short profile of our famous forebear, **T.C. Chamberlin**, in the Rock Stars series, which appears occasionally in GSA Today.

Under the able leadership of **Gordon Medaris**, a group of us completed an article that is in press about important key relationships among Proterozoic rocks in the Hamilton Mound inlier in central Wisconsin. Our research clarifies ages of an enigmatic Baraboo Quartzite-like rock and an older meta-arkose intruded by granite. The distinction of these two sedimentary units had not been recognized before, which caused much confusion about correlations with other areas and some resulting anomalous interpretations. We have shown that the meta-arkose was derived from erosion of the Penokean orogenic belt and that the quartzite was subsequently deposited unconformably upon the other two rock types. Although Hamilton Mound is a small, isolated area, it fills a large gap in our knowledge of the regional aspects of the "Baraboo Interval" (1.75-1.63 Ga).

The Wisconsin Public Radio network selected the **Dott and Attig** Roadside Geology of Wisconsin for one of the premiums to be awarded during its winter fund drive. John and I appeared on the station for an interview and question session. Also during the winter, I was interviewed for the university's oral history project. I do not think that I revealed any seriously dirty laundry. Nancy and I traveled to Oregon in March to help celebrate the 200th anniversary of the beginning of the Lewis and Clark return east after a miserable, cold, wet winter at Fort Clatsop near present Astoria, OR.

During June we traveled across the Atlantic first to Britain and then to the Czech Republic. "Tex Czech" alumni **Gary** and **Dianna Kocurek** gave us a wonderful week-long tour of their fascinating ancestral homeland. Gary (PhD 1980) is a Professor of Geology at the University Texas-Austin and Dianna (MS Chemical Engineering 1980) is an environmental consultant. They now own at least three real estate properties in the Czech Republic, including flats in a high-rise building in the Old Town of Prague. Gary has said that "Czech property is too good an investment to pass up." When they are at home in Texas, the ►►

Kocureks reside in their own castle, which they built near Austin. Theirs is much more comfortable than the European medieval models, however.

From August through December, I was successfully treated for lymphoma. My chemo treatments were not so severe as many people experience, so the ordeal was not terribly grueling. Nonetheless, it is not an experience to be envied. Support from many friends, including a few alumni who are lymphoma survivors, were very helpful. A clean bill of health in mid-December provided a welcome Christmas present.

Louis J. Maher

I was very honored and pleased when my children contacted the department and arranged to provide three framed pictures of my air photos for the walls of the Geology Library (see page 11).

My paper on the pollen in bat guano was finally published in *Paleo3* (v. 237, Issue 1), a special issue on "Advances in the Interpretation of Pollen and Spores in Coprolites." I was surprised when the *Milwaukee Journal Sentinel* did a piece on my paper; some of you with too much time on your hands may wish to check it out on the web (<http://www.jsonline.com/story/index.aspx?id=482953>).

In the last year or so I gave various illustrated talks entitled *Geology by Lightplane* to the Oshkosh, River Falls and Fox Valley UW Campuses and to a Rock and Mineral Club in West Allis.

During spring **Dave Mickelson** and I took a small-engine course from MATC; we now can handle most problems of recalcitrant small 4-cycle engines. Alas, my small motors are all 2-cycle. Dave and I have also been flying to take photos of the Ice Age Trail. A group of the **Quats** ventured out to North Dakota during the spring to attend a Friends of the Pleistocene meeting; it is always fun to see colleagues both old and new.

In August I drove out to Bozeman, MT to attend an AMQUA meeting. I stayed with son Rob's family, and took Rob along on the pre-conference field trip to Yellowstone Park. He routinely hikes and skis in the park, and I thought it would be good for him to know some of its glacial history.

Jane and I visited a number of state parks with our small motor home, and we took our annual trip around Lake Superior. Because our family enjoyed Monty Python when the kids were growing up, Jane and I recovered our youth by taking a tour to Chicago to see Monty Python's *Spamalot*. Jane arranged for a delightful week's retreat in July with our children, their spouses, and our grandchildren at a cottage in Vilas County.



Three spectacular large color photographs now hang in the Geology Library. Lou Maher's dramatic air photos (image below) were presented to the library by the Maher family to commemorate his 41 years of teaching and service. Above, Lou and Jane Maher with their sons, Rob and Jim Maher, and daughter, Barb Flatt. (Dave Mickelson)

Jane and I were able to spend three weeks in France during September. We had a really good time, and we got to drive over the Millau Viaduct, a beautiful cable-stayed bridge over the very deep valley of the Tarn River. We had seen it under construction in previous years, but were delighted to have a chance to drive over it. Its construction removed a serious bottleneck on the motor way, and the clever design of the bridge allowed a marvelous view of the Tarn Valley.

During the fall **Ben Abernathy** flew me in a Cessna 150 to photograph **Alan Carroll** in his new Vans airplane so Alan could submit it for consideration for the Vans calendar. Retirement is really becoming a way of life!



Sheep Mountain, Big Horn Basin, Wyoming. (Lou Maher)

Gordon Medaris

Retirement continues to be filled with travel and research. Recreation included snorkeling in Florida, Long Island (Bahamas), and Baja California, paddling in Wisconsin, Minnesota, Iowa, and Florida, and a nostalgic climbing trip to one of my favorite destinations, the Black Hills, which however, may have marked a farewell to climbing (at least in terms of lead climbing). In advancing age, I'm turning more to paddling and peddling, which are much less strenuous than climbing on my geriatric joints.

Recent publications include a P-T-t evaluation of eclogite in the Bohemian Massif with **Ed Ghent** (Calgary), **Herb Wang**, **John Fournelle**, and **Emil Jelínek** (Prague) (2006, *Mineralogy and Petrology*, v. 86, 203-220), an investigation of HP garnet pyroxenite and eclogite in peridotite in the Bohemian Massif with **Brian Beard** and **Emil Jelínek** (2006, *International Geology Review*, v. 48, 765-777), and a petrotectonic investigation of mantle xenoliths along the San Andreas fault zone with **Sarah Titus**, **Herb Wang**, and **Basil Tikoff** (2007, *Tectonophysics*, v. 429, 1-20).

Investigation of Paleoproterozoic metasedimentary rocks at Hamilton Mounds, Wisconsin, has been completed, and the paper will appear in a special volume of Precambrian Research devoted to Proterozoic evolution of the midcontinent region. Another paper on "Differentiating pedogenesis from diagenesis in early terrestrial paleoweathering surfaces..." with **Steve Driese** (Baylor) and others is



In May Gordon Medaris, above, right, was awarded the Borick Medal by Charles University, Prague, for his work in the Bohemian Massif. (Courtesy of Gordon Medaris)

in review with the *Journal of Geology*. Continuing research includes further work on Czech eclogites and peridotites, Proterozoic sedimentary rocks and unusual minerals (agrellite, miserite, and svanbergite) in Wisconsin, and granulite facies rocks in the Rattlesnake Creek terrane, Klamath Mountains, California, with **Ed Ghent** and **Sarah Garlick** and **Art Snoke** (Wyoming).

In May I traveled to Prague, where I was awarded the Borick medal from Charles University for my work in the Bohemian Massif. The medal is named after Emmanuel Borick, who was a 19th century chemist at Charles University and one of the first scientists to investigate the chemical compositions of minerals. I was greatly honored to receive this award, which was made possible through collaboration with Czech geologists, most notably Zdenek Mísar, Emil Jelínek, and Arnoat Dudek, and many supportive colleagues in Weeks Hall.

Dave Mickelson

I am keeping busy in retirement and enjoying life a great deal. In 2006 **Kurt Refsnider** finished his MS thesis on glaciation in the Uintas and moved on to the PhD program at the University of Colorado. **Mike Swenson** also finished his thesis on Lake Superior shoreline processes. I continue to work closely with Bayfield County planning and zoning personnel to come up with a scientifically based setback ordinance for new construction along the shore, and so made several trips to Lake Superior. We enjoyed getting to know **Xu Liubing**, a postdoc from China, who worked in the cosmogenic lab for six months processing samples for our Uintas project. I'm also still supervising two grad students who will hopefully finish soon. Vin and I have enjoyed traveling around the state to give talks on Wisconsin's landscape. I gave about 20 talks to the general public during the last year. **Lou Maher** and I have been taking photographs from the air for a book on the geology of the Ice Age Trail. We also both took a class on repairing small engines in the spring. In the fall I took a cabinetmaking class. Both provided a break from geology! My spare time has been spent pursuing family history, and of course, Vin and I spend a lot of time at our place in Dodgeville. We had a fair-sized garden, and at the end of January we are still eating potatoes from it!

Getaway trips to Missouri and Arkansas, lower and upper Michigan, and Massachusetts were done in the car so we could take the dog. I flew to Hamilton College to give a talk and visit with **Todd Rayne** and **Eugene Domack**. I also enjoyed seeing many alumni at GSA in Philadelphia in October. Son John is now teaching high school math in Evanston, Illinois, and Amy still lives in Milwaukee, so we see both of them quite often. Unfortunately Becca's husband Rob died just before Christmas, so this past holiday season has been sad. But, we look forward to a good year ahead and hope to see many of our alumni at various functions throughout the year! ●