

Emeritus Faculty News 2008

CHARLES R. BENTLEY

The highlight of my year came right at the beginning—in January I returned to Antarctica for the first time in 14 years! The reason was to visit the WAIS Divide site in central West Antarctica where our Ice Coring and Drilling Services group (ICDS) was completing its first of a planned four seasons of deep ice-core drilling. They are using the new Deep Ice Sheet Coring (DISC) drill that ICDS designed and built. The site is over the Byrd Subglacial Basin on ice more than 3500 m thick. Going there was like old home week for me, because it is close to the route of my first full traverse out of Byrd Station (the Sentinel traverse) exactly 50 seasons earlier.

In late 2007 and through 2008, I participated in Polar Palooza events in five widely scattered U.S. cities. Polar Palooza is a touring show, sponsored by NSF and NASA, that features tales of science and adventure from a changing cast of polar glaciologists, geologists, climate scientists, oceanographers, biologists and residents of the Arctic. Each tour stop (20, in all) includes multimedia shows with high-definition video, school programs, teacher workshops, and briefings for media and business leaders. My role was two-fold: to talk about what Antarctic traversing was like 50 years ago, and to explain ice coring—how it's done and why. UW alumni **Richard Alley** and **Sridhar Anandakrishnan** also participated.

In February, I took part in a “Polar Weekend” at the American Museum of Natural History in New York, sponsored by Lamont Doherty Earth Observatory (of which I'm an alumnus) in which my main activity was to demonstrate drilling ice cores, using a small hand-held, electric-drill-powered corer. The children loved it, and it gave me an opening to talk to their parents about why cores are important in studying climate change. The event ran on the first weekend of the month, so on Sunday we were competing with the Super Bowl, which featured the New York Giants. Even so, the attendance at the Museum was not noticeably reduced from Saturday's.

After eight years, we finally came to the end of our ICDS contract with NSF. However, we won the competition for the next round of drilling support, so we now have a brand new cooperative agreement with NSF to continue our activities under a new, more complex, two-layer structure. If you're interested, go to www.nsf.gov/news and search for Press Release 08-219.

NIKOLAS CHRISTENSEN

The past year was extremely rewarding and busy. I completed several long term research projects, including research in New Zealand and Alaska funded by the NSF Continental Dynamics Program, and began several new projects. My work in Taiwan is now in its fourth year. The project, which is funded through 2010, involves collaboration from six US institutions, as well as support from Taiwan and Japan. Onshore-offshore and land refraction- reflection seismic transects are scheduled for this year. Our laboratory-based studies of P and S wave velocities and their anisotropies will be used to interpret the crustal composition and deep regional structure of Taiwan. Taiwan is a result of the most active arc- continent collision in the world, with an uplift of 3 cm/year and a convergence of up to 8 cm /year. Many of the exposed rocks have strong fabrics and the seismic results are expected to display significant anisotropy.

I have recently started a joint project with scientists from the University of Hawaii, which has been funded by the Marine Geology and Geophysics Program at NSF. The objective of this project is to provide detailed information on the mineralogy, micro-textures and seismic velocities of serpentinized peridotites from serpentine mud volcanoes in the Mariana forearc region (west of the Mariana trench) in order to understand the composition and evolution of the forearc mantle wedge in this region. Preliminary studies suggest that many of the serpentinites dredged from the seamounts are derived from the forearc mantle and subducted slab. The project will provide information regarding the effects on seismic velocities of serpentinization and of strain partitioning in the forearc mantle, as well as an understanding of the controls on seismicity in subduction zones. In a related study, I have begun working on the interpretation of seismic studies of the subduction zone beneath Vancouver Island and Western Washington. Based on laboratory measurements of rock velocities as a function of pore pressure, it appears that the oceanic crust beneath this region is overpressured (near hydrostatic), a result with a range of important implications including an understanding of the temporal and spatial occurrence of episodic tremor and slip (ETS) in Cascadia.

DAVID L. CLARK

After 36 years in Wisconsin and eight in northern California, Louise and I are now adapting to the mountains and climate of Utah. And while the final details of global warming are still being assimilated, we are digging out from heavy snow-falls in Utah, as evidently folks are in Wisconsin, and my Arctic colleagues tell me that this could be the third year in a row that the Arctic ice pack maximum will expand in March (although still to a lesser extent than the 1960's maximum expansions when we were working there). Perhaps it is time to consider getting on a *global cooling bandwagon*, but this may be premature?

The University of Utah Press published my biography of a great, great grandfather who was an extremely interesting 19th Century New York to Utah pioneer, and while geologic output was at a minimum in 2008, I reviewed a couple of papers and gave an Arctic (and conodont) seminar at BYU. Surprised that former colleagues **Charlie Byers** and **Mary Anderson** are hanging it up so early, but wish them well in retirement. At the current rate of attrition, in another year or so it might be possible for me to walk through Weeks Hall and not recognize anyone. This past year, I've had contact with **Tom Morris**, **Scott Ritter**, **Mark Solien** and **Reed Meek**, old grads who worked with me, as well as **Bart Kowallis** and **Jeff Keith**, old grads who had a different persuasion when they studied in Madison. I would enjoy hearing from former students and colleagues. dclarksr@gmail.com

CLARENCE S. CLAY

This is a sketch of my paths. Kansas State Foundation sent a June 1943 picture of engineering and science students being called to active duty. I am in that picture (photo opposite). The army sent me to camp and then to its specialized program in electrical engineering at the University of Cincinnati and Ohio State. In the spring of 1945, the army sent some of us to the Signal Corps radar school. We learned to operate and repair radars (10 cm wave length). In the summer of 1945 the war ended. I came out of the army with “state of the art” signal theory, wave propagation and electronics as “tools.” For me an idea, a guess, and little experiments, often opened new paths. It is a bit like improvising in music.

I took a path from spectroscopy and teaching at the Univ. of Wyoming to an oil company research lab in Tulsa. I did seismic and electrical geophysics. The move to the Columbia University Hudson Labs for underwater sound research



Clarence Clay (arrow), with other Kansas State University ROTC engineering and science students, is being sworn in for active duty at graduation in June 1943. (KSU Archives)

was easy. In 1955 our systems were basically two-channel magnetic tape recorders and multi-channel paper records—standard seismic systems. For calculations, we had slide rules, adding machines and paper/pencils. A simplified ocean structure is layered. Wind causes waves on the ocean's surface and it's near subsurface. The water density increases as one goes deeper and waves and currents exist. Ivan Tolstoy had started his under water sound research in the shallow waters off Long Island, NY. Ivan's paths were the long-range transmissions through layered media. M.A. Biot and Tolstoy wrote a paper, "Formulation of Wave Propagation in Infinite Media by Normal Coordinates with an Application to Diffraction." I mention this because they proved that Huygens optical methods are approximations. My first paths were the reflections of sound waves from a rough sea surface. The next steps were the transmission of signals in a complex ocean. Tolstoy and I put our physics into Tolstoy and Clay, *Ocean Acoustic, Theory and Experiment in Underwater Sound* (1966—2nd Ed. 1987). Summer 1967, I accepted the offer of a professorship in geophysics in Madison and started teaching in spring 1968.

Classes in the survey of oceanography were popular. I gave lectures on the physical oceanography and got help from John Magnuson for marine life. This opened a gate into using sonar to make estimates of fish populations in lakes and the ocean. The old methods of using traps for random samples on random days were poor. For sonars, how much sound did fish scatter? Huang and Sun did a series of measurements on the scatter of sound from a live fish and showed that most of the scattered sound came from the fish's air filled swim bladder.

With students and visitors (S.B. Brandt, **D. Chu**, B.G. Heist, J.K. Horne, J.M. Jech, R.D.M. Nash, and T.K. Stanton), Magnuson and I started quantitative bioacoustics in Madison. Scattering theory and early fish results are in *Clay and*

Medwin, Acoustical Oceanography: Principals and Applications (1977). Both Ocean Acoustics and Acoustical Oceanography were published in Russian. Beginning in 1978, H. Medwin and his students did acoustic diffraction experiments to compare Helmholtz-Kirchoff (HK), the Biot-Tolstoy (BT) and data. The BT theory was accurate and the HK was not. Here, S. Li and I used spark sources to do many experiments. Our data matched BT. The original BT theory was for fluid media next to a rigid wedge. For his thesis, De-zhang Chu derived the exact impulse response of a density contrast wedge. The source could be in either medium. Medwin and I put BT, Chu, and experiments into *Medwin and Clay, Fundamentals of Acoustical Oceanography*, 1998.

My new recent interests are fractals and chaos in our world.

ROBERT H. DOTT, JR.

For a change, I stayed on the North American continent in 2008. **Gordon Medaris** and I continued studies of the classic Baraboo District by examining and sampling cores taken one hundred years ago, which fortunately have been preserved in the Wisconsin Geological and Natural History's core repository. We are interested in the late Precambrian strata that overlie the Baraboo Quartzite, but are known only from the subsurface. The accidental discovery of iron in 1900 in a well being drilled for water led to the development of three underground mines, which were active until the 1920s. In the mines and through core drilling, two formations were defined above the Quartzite, one of which contains the iron ore. These rocks have not been studied for sixty years, so we decided to investigate their sedimentology, metamorphism and structural condition. Simultaneously, post-doctoral fellows **Adriana Heimann** and **Andrew Czaja** are concentrating upon the iron formation as a part of the interdepartmental program

in astrobiology. All of our studies are ongoing.

The campus's third annual Darwin Day observance in February was a big success thanks considerably to **Dana Geary**, one of the co-organizers. Appropriately, arch-anti-creationist Richard Dawkins spoke on the campus shortly after Darwin Day. His hard-hitting lecture was a fitting additional tribute to the great author of natural selection. Also fitting was that my book reading group had recently read Alfred Russell Wallace's *Natural History of the Malay Archipelago*. It was Russell who independently hit upon the concept of natural selection based upon his extensive observations of organisms in far corners of the earth much as Darwin had done before.

I gave several lectures during the year. Most were about the geological relationships between southern South America and Antarctica based upon the field trip that **Ian Dalziel** (Faculty 1963-66) and I had led in late 2007—*In the Footsteps of Darwin in Tierra del Fuego and Patagonia*. That trip was a part of the London Geological Society's 200th Anniversary celebrations. I also led some field trips for lay groups, most of which were to the Baraboo area.

In the last part of the year I was recruited to give testimony in hearings for a challenge to an ambitious project to develop yet another large resort complex near the southern end of the Dells of the Wisconsin River. If the original plan were to be allowed, a fine stand of pine and other tree species would be affected and I feared that some cliffs of Cambrian sandstone would be compromised by blasting for construction and/or excessive foot traffic after development. I also feared that site disturbance would cause erosion of much loose sandy river deposits laid down during the great canyon-cutting floods during the draining of Glacial Lake Wisconsin about 14,000 years ago. These are the same deposits that were breached and suddenly eroded during the catastrophic draining of nearby Lake Delton in early June, which many readers will remember. Conferring with lawyers and participating in very long, tedious testimonies was a wholly new experience, but, like jury duty, not one I wish to repeat. After several months of hearings, the issue has not yet been resolved, but it seems likely that in early 2009 the plaintiffs may win a significant shrinkage of the project.

I continued as Chair of the Wisconsin Geological and Natural History Survey's geological mapping advisory committee and also continued participating in a personal reminiscence-writing group, which takes up more of my time

now than geological writing.

Through the year I enjoyed seeing a number of alumni. **Tom Doe (MS 1973, PhD 1980)** visited the campus in February to participate in the Geological Engineering's Visitors' Board meetings and to recruit students for jobs with his firm, Golder Associates. We also saw Tom and Paula in Washington State in November, while we were visiting our son, Brian, and his family in Walla Walla. Tom took us on a fascinating one-day trip to see some effects of the famous Spokane floods and post-flood loess deposits of the Paluse Hills. Continuing an annual tradition, **Steve Born (PhD 1973)** and I lunched together a couple of times and swapped lies. In February, while visiting my sister in Palm Desert, CA, **Martin Kennedy (BS 1986)** and his wife, Eva, came over from Riverside, where he teaches at UC-Riverside, to lunch with us. Finally, our son-in-law **Gary Gianniny (MS 1990, PhD 1995)** helped to host us in Durango, CO for Christmas. I always look forward to the chance to see a number of other alumni at annual meetings of our Board of Visitors and at alumni reunions.

While in Colorado celebrating the holidays with both of our daughters and their families, we visited Telluride, CO so the younger ones could ski. Even allowing its metamorphism into an upscale tourism destination like other famous western mining centers (e.g. Park City), it was a delight to see that famous, old mining town for the first time. We had more snow and cold in Colorado than we had been having in Madison, though overall it will be close to a tie for the winter, I suspect. By the way, I am tired of winter as I write this.

LOUIS J. MAHER

I got to count a couple of pollen samples that a driller dropped off with **Anders Carlson, Dave Mickelson's** replacement and a former student. It is strange how one forgets the details of pollen grains after five years. I also loaned pollen slides to **Kelly LeBlanc** at Beloit. I gave an illustrated talk to an Experimental Aircraft Association (EAA) group's winter dinner at Whitewater, and attended a Friends of the Pleistocene Meeting at DeKalb, Illinois. During the spring a couple of undergrads borrowed sampling equipment to work on stream sediment in the arboretum. It came back broken, so no names are provided here. Later I put together a series of photos showing the construction details of my Livingstone piston corer. Anyone interested in such devices can download a Power Point file from: <http://www.geology.wisc.edu/~maher/LivingstoneSampler.PPT>.

Dave Mickelson and I took shoreline photos

along Green Bay and the Door County peninsula in a plane flown by department computer expert **Ben Abernathy**. In May I was asked to speak to a graduate seminar on how I got into geology. I do not know what they learned, but I enjoyed doing it and was honored to be asked. I read **Richard Alley's** *The Two-Mile Time Machine* and enjoyed it thoroughly. While Jane and I visited Washington Island we ran into **Nancy (Neal) Yeend** and her daughter. Nancy had worked in my pollen lab when it was first set up. Jane and I also attended the large June birthday party of **Marion Meyer**. We also got to have lunch with **Charlie Schweger** and his wife Barbara when they were in town. One laughs a lot when Charlie is around. At the G&G Alumni Reunion I got to thank **Bob Sterrett** again for scuba-diving twice beneath the ice at Devils Lake to help retrieve broken sampling equipment.

You may know that Lake Delton, up by the Dells, precipitously overflowed and drained on 9 June during the spring floods. I've flown over on three occasions to photograph the initial damage and the subsequent reconstruction. Three members of the State Survey, **John Attig, Thomas Hooyer, and Eric Carson** drove up to the Devils Lake area with me to see the remarkable work that **Diane Kiesel** has done in exposing the debris-filled potholes along the Potholes Trail.

GORDON MEDARIS

Retirement continues to be filled with travel and research. The year began with paddling and biking in north central Florida, followed by snorkeling and biking in Mayaguana, which is an undeveloped and remote island in the Bahamas—a terrific place to really get away. In May I made my annual pilgrimage to the Institute on Lake Superior Geology Conference in Marquette, Michigan, where **Bob Dott** and I presented a paper on the Seeley Slate, which is the stratigraphic unit above the Baraboo Quartzite, occurring only in the core of the Baraboo syncline. The Seeley Slate is another interesting chapter in the Baraboo saga, and it may eventually lead to establishing the age of folding of the Baraboo syncline, so stay tuned.

In September I returned to the Czech Republic for two weeks of field work, during which I was fortunate to hear some marvelous musical performances, including the season opening concert of the Czech Philharmonic, another concert by the Polish National Radio Symphony Orchestra, and a 100th anniversary performance of Mahler's 5th symphony by the Czech Philharmonic, which premiered in Prague. After completing field work, Nancy joined me

as we continued our exploration of bike paths along European rivers, this time biking for three weeks along the Elbe River from Decin in the Czech Republic, past Dresden and Meissen, to Cuxhaven on the North Sea. Mostly an enjoyable trip, except for those days when we faced strong headwinds from the North Sea (the numerous wind turbines in northern Germany are there for good reason!).

In 2008 **Steve Driese** and I published a paper on the Baraboo paleosol (*Journal of Sedimentary Research*, v. 78, 443-457). Three other papers are in press, including further work on the Sandvik garnet peridotite, Norway (*Lithos*), the geochemistry of an interesting suite of Fe-rich peridotites and pyroxenites in the Czech Republic (*Chemical Geology*), and the petrology and structure of the amphibolite to granulite facies Seiad meta-ophiolite complex in the Klamath Mountains (to appear in a GSA Special Paper).

DAVE MICKELSON

The year slipped away quickly but looking back a lot was accomplished and it was certainly enjoyable. I had several consulting projects that kept me busy part of the time, and quite a bit of time was spent on writing for the *Geology of the Ice Age Trail* book that **Lou Maher** and I hope to have published in the next year or so. The book provides a good excuse for getting out and about in Wisconsin, and Vin and I did a number of short trips to various parts of the state. Lou and I did photo flights for the Ice Age Trail book with **Alan Carroll** and **Ben Abernathy** as pilots, as well as photographing the west side of Green Bay and the whole coast of Door County. I spent a good deal of time in the fall mapping changes along the Lake Michigan shoreline between 1976 and 2007 using low-level oblique photos. I continue to give many talks around the state as part of the UW Speakers Bureau. I enjoy presenting on various aspects of Wisconsin geology.

Vin and I spent quite a bit of time at our land in Dodgeville particularly during gardening season. We now have several raised beds and a 30 x 50 fenced area. I even sold some squash and potatoes at our local co-op. We had a nice hike there with **Bob** and **Renate Sterrett** when they visited in the fall, and enjoyed their visit.

Ben Laabs has visited a couple of times to wrap up our Utah project, and I've enjoyed brief visits with other alumni at various functions. Congratulations on your GSA award, Ben! (See page 7)

Our daughter Amy has moved back to Madison and is studying to become a registered gemologist, Becca and Shaynnah also live in the Madison area. John continues to teach math in Evanston, IL. ●