Emeritus Faculty News 2003

Charlie Bentley

As I could not restrain myself from announcing last year, ICESat, carrying the GLAS laser altimeter was finally launched on Jan 12, 2003. Unfortunately, the news has not been particularly good since then. The initial returns looked good, but the first laser failed after only a few months, and the instrument team has been struggling since then to evaluate how to take the best advantage of the remaining two lasers, whose lifetimes may very well also be limited. Former UW student **Ben Smith** (MS '99), now at the University of Washington but with whom I still work, will not have the time series he had planned on to reveal height changes on the West Antarctic ice sheet. Instead he will have to see what he can learn from the initial round heights themselves. Disappointing, but we still expect plenty of useful data over the lifetime of the mission.

Ice Coring and Drilling Services (ICDS) continues to be my main activity.

1. The first, largest, pieces of the new "Enhanced Hot Water Drill" (EHWD) for the $250M IceCube project at South Pole have been shipped; other parts will be shipped this year. The hope is to have the entire drill operational at the Pole by the end of the 2004-05 field season.

2. This season (2003-04) we are supporting coring projects on the ice-covered flank of Mt Moulton, in West Antarctica, for Todd Sowers of Penn State and in the "megadunes" region of central East Antarctica for Jeff Severinghaus of Scripps. We also supported a core drilling project in Greenland last summer for Joe McConnell of Arizona.

3. An ICDS crew is completing a third 300-m-deep, 12-inch-diameter hole at the South Pole to supplement the two into which the USGS's new seismograph system was emplaced last year. The deep ice several kilometers from the Pole Station has turned out to provide the lowest background noise of any seismograph station in the world! The new hole is for back-up and possible future experiments.

4. We are now going full steam ahead on designing a new deep coring drill, whose first target will be the WAISCORES inland site about 60 km northeast of Byrd Station. We plan to have the complete drill system built in time for a full-scale test drilling season in Greenland in 2005, with Antarctic drilling to commence in 2007-08.

I'm happy to report that five members of our one-time West Antarctic ice stream research group were honored in 2003 by having Antarctic ice features named after them. What was formerly known as Ridge DE (between ice streams D and E) is now (**Sion**) **Shabtaie** Ice Ridge. (**Sridhar**) **Anandakrishnan** Glacier, (**Ted**) **Clarke** Glacier, and (**Neal**) **Lord** Glacier can all be found along the Amundsen Sea coast northwest of Byrd Station, whereas (**Don**) **Blankenship** Glacier is a tributary of Ferrar Glacier in East Antarctica west of McMurdo.

Dave Clark

Life in California is still good, especially since The Terminator is in charge and is going to solve all of the state's problems. Louise and I are especially fond of the weather this year. As I write this, we are comparing our winter with that in Madison. It's green, sunny and 60 here!

On a visit to the department in May, I picked up one of my Arctic cores and am sampling it for additional data on the calcareous dinoflagellates that **Mark Gilbert** and I studied 20 years ago. I am convinced that the dinos are very sensitive climate indicators for the ocean and will give good data on Cenozoic climate warming in the Arctic.

Ron Charpentier visited this year and he took me to dinner at one of the five-star restaurants in the neighborhood. I visited with **Nik (Christensen)** at the AGU in December but missed seeing others from the department at that massive meeting. Why don't we have a department reception at the AGU?

I watch the construction of the building addition with interest, thanks to **Ben (Abernathy)'s** camera and look forward to a tour of the facility soon.

C.S. Clay

Is our Earth moving into an abrupt climate change? Will it be hot or pass quickly to an ice age? I like to start with data. My trip to the Arctic and **Richard Alley's** research are data. The analysis tools are from chaos, fractals and self-affine models. Rather than starting with theory, I just want to give a picture of a climate time series and apply the self-affine analysis. This time series is from Alley's *The Two-Mile Time Machine* (2000) and *Abrupt Climate Change* NRC (2002).

In April of 1972, **Jon Berkson, Tze-Kong Kan** and I took our sonars to Alaska and the Arctic to image the underside of sea ice. From Point Barrow, we were flown to the old ice island, T3, about 300 km from the North Pole. The temperature was a steady -30 C. The one year old leads in the ice were 2 to 3 m thick. We had to put our sonar beneath the ice so we looked for these thin leads and places to drill our holes. Our side scanning sonar images showed a smooth bottoms under the leads and the ridges gave good strong back scatter. The topside 2 to 3 m high ice ridges extended down 10 to 20 m or more. The old Arctic hands said that the pack ice was normal. Now, three decades later, the Arctic sea ice is less than a meter thick and there is open water [M. Strum, D. Perovich, and M. Serreze, "Meltdown in the North", Scientific American, 60-67 (Oct. 2003)]. Something is happening.

The duration of a frozen Lake Mendota is a fairly robust measure of our local winter climate. The freeze dates and ice breakup dates have been recorded since 1851. Since 1970 and with fluctuations, the freeze dates have gotten later and the breakup dates are earlier. As measured by ice durations, Madison winters are shorter **D. Robertson, R. Ragotzkie,** and **J. Magnuson,** "Lake Ice Records Used to Detect Historical and Future Climatic Changes", *Climatic Change* 21: 407-427 (1992)]. Perhaps, the Arctic climate change, our shorter winters and the driftless area west of Madison go together.

Years ago, M. Ewing and W. Donn wrote "A Theory of Ice Ages", *Science* 123, 1061-63 (1956). They used cores of the ocean sediments from Arctic to argue that the Arctic Ocean was open during glacial periods. With an even partially open Arctic Ocean, it doesn't take much imagination to expect huge changes in surface waters of the North Atlantic and the Gulf Stream.

A picture of the relative temperatures over 800 thousands of years (Fig. 1), is my start. For the last 400 thousand years, the temperatures fluctuate between upper and lower limits. Notice that this year (Now), the temperature is at the top of the fluctuations. The dependence of the variance V(T) on the duration T is a standard self-affine test, $V(T) \sim T^{2H}$, where H is the Hausdorff measure. The results are in figure 2. The intervals with T<20 thousand years appear to be self-affine with H=0.43. The standard normal statistics do not work here. Over intervals >20 thousand years, the climate appears to have a bounded randomness (H=0) and normal statistics may work.

I think that what is perceived as "Global Warming" is the start of a climate mode change to an ice age. The actual mode change might take less than a decade. For a popular article, read: Spencer Weart, "The discovery of Rapid Climate Change," Physics Today, Aug. 30-36 (2003).

In Pennsylvania Dutch, "Ve ist having a Visconsin vinter."

Cam Craddock

Our year was mostly about genealogy, geology, and family visits. In February we flew to Germany to see son John and family while he was Visiting Professor at Erlangen University. John led a trip to Bavaria and Austria to see Neuschwanstein Castle, a country hotel to celebrate Annie's 13th birthday, and the walled city of Nordlingen. That city is on a hill of impact breccia, site of Europe's largest impact structure. My advisor Walter Bucher received his PhD at nearby Heidelberg U. in 1911, and spoke often of student visits to Ries Kessel (Nordlingen) and the Steinheim Basin.

We celebrated our 50th wedding anniversary June 13. Our neighbors, the Scheffels, surprised us with a champagne lunch on their patio (see photo, following page).

With sadness we note the death of brother William Bruce Craddock in Cincinnati July 22. Bruce earned a PhD in English at the U. Texas-Austin and taught at Ohio U., Wilkes College, and the U. of Cincinnati.

In October we flew to Portland to visit daughter Carol and Gregg Hammann in Brush Prairie, WA. Gregg is now President and CEO of Nautilus Group, Inc., a maker of exercise equipment.

Some genealogy news: My paternal grandmother Nellie Cundy was born in Houghton in 1872, but we believe her family came from Cornwall to SW WI in 1842 to mine lead—moving later to the U.P. We found the graves of William Cundy and family in Elk Grove cemetery, Lafayette County. He was the third postmaster of the Elk Grove P.O. (est. 1858).

Nellie's husband Alexander Siller left about 1898 to seek a new life out west. From the Spokane Library we learned that he ran a four-story hotel there, that he had a second wife, and that at his death in 1941 he had two sons in Juneau, AK. We think they had a helicopter business.

In September we went to Houghton to meet two special visitors from England, Jan Wood and John Roper. We have

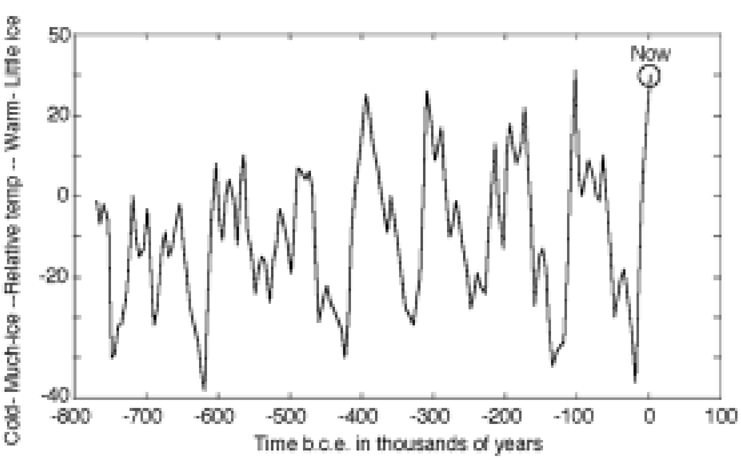


Fig. 1. History of Land Ice.

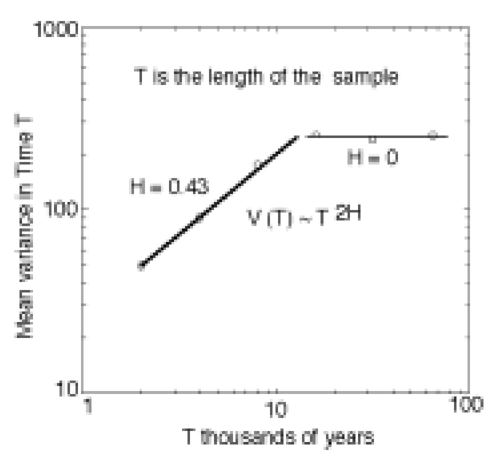


Fig. 2. Variance analysis V(T), Alley data.

Dottie and Cam Craddock celebrate their 50th wedding anniversary. Photo courtesy of C. Craddock.

common ancestors, the Pryors, who came to the Copper Country in 1852-53 with 12 of their 14 children. One son had already gone to Australia; Jan is his descendant. She went back to England, and works in the Devon County Archives office. John (*Lord* Roper) came from the other child. He is Professor of Economics at Oxford University, and a member of the British House of Lords. Isn't genealogy fun?

Finally, do not seek me in my old Weeks Hall neighborhood. I was invited to change offices to avoid an imminent wrecking ball. Now for a geologist an eviction ranks up there on the Agony Scale somewhere between a case of leprosy and a double root canal. I spent August downsizing again and preparing; then one morning in 90 minutes three husky grad students transplanted me across the courtyard to a strange new world. Because the UW locksmith was unavailable, I also took my old door with me.

Robert H. Dott, Jr.

Nancy and I began the year in Walla Walla, Washington at the edge of the Channeled Scablands, where much of our family gathered for Christmas. From there, the two of us migrated south like birds for a fine cruise in the Sea of Cortez. We landed on several islands underlain by volcanic rocks formed within the early Cenozoic magmatic arc that formed the western margin of our continent before the Sea of Cortez was opened by the late Cenozoic transcurrent displacement northward of Baja California. Next we traded the ship for a train to carry us up through the Copper Canyon on the mainland. This spectacular gorge was carved into an enormous part of the same early Cenozoic volcanic complex.

We logged considerable time tending grandchildren during the late winter while their parents played. First we were in Raton, New Mexico and then in Durango, Colorado. In May we were back in Raton for a high school graduation. Besides the family connection, northeastern New Mexico has interesting geology. It has one of the best-documented K-T boundary intervals within wholly non-marine strata. It also has an extensive late Cenozoic volcanic field related to the Rio Grande rift fifty miles to the west. Our son-in-law, engineer Bill Ordemann, works for El Paso Energy Co. at Raton on a large coal bed methane extraction project on one of Ted Turner's large ranches.

Summer time brought the publication in the *Journal of Geology* of two articles with which I was associated. In the first one, **Gordon Medaris**, **Brad Singer, Clark Johnson**, myself, and others presented new data on the age of the Baraboo Quartzite (ca. 1700m Ma) and documented pre-quartzite intense weathering. The second article culminated my long interest in pure quartz sandstones, of which we have in Wisconsin some of the world's finest and earliest-studied examples (my house is built upon one). Gordon's work with pre-1700 Ma paleosols indicates a chemical maturity at least as great as that of the most mature modern tropical soils. Pure quartz sandstones like the overlying Baraboo Quartzite and our Paleozoic examples have long presented a paradox—how could intense weathering produce such pure sands on landscapes presumed to be completely free of vegetation? I believe that microbiotic crusts or mats must have covered subaerial landscapes on a large scale throughout Proterozoic—perhaps even as early as late Archean—time long before megascopic plant fossils appeared in Silurian strata. These crusts would have helped stabilize land surfaces and also provide organic solutions to facilitate chemical weathering.

Also during the summer, the 7th edition of *Evolution of the Earth* appeared, but co-author Donald Prothero (Occidental College) did 95% of the work this time. The final manuscript for another book, the *Roadside Geology of Wisconsin* by **John Attig** (PhD 1984) of the Wisconsin Geological and Natural History Survey and myself went to the publisher, Mountain Press of Missoula, Montana. It is due to appear in bookstores in March 2004 (see discussion elsewhere).

There was time for a little bit of field work related to Cambrian sedimentology (of those pure quartz sandstones) and to jelly fishing. Two colleagues continued detailed work on the stranded Cambrian jelly fish impressions found several years ago in central Wisconsin (featured in the 2001 *Outcrop*). My role in this project is relatively minor now, for I defer to younger energetic associates (Whitey Hagadorn of Amherst College, Rob MacNaughton of the Geological Survey of Canada, and professional collector and dealer Dan Damrow) to do the grunt work needed for the second phase of our study.

In September I took Nancy to Nancy, France, to spend a week with **Tom** and Paula **Doe** (Tom got his MS in 1973, PhD in 1980 and Paula simultaneously earned the PhD in Japanese studies.) The Does were spending a year in Nancy, where Tom worked in a French laboratory researching the possible disposal of nuclear wastes in shale within the region where the Jurassic System was named. Our visit included visits to Roman ruins, World War I trenches, and a drive to the Rhine Valley over the Vosges Mountains with their core of Hercynian basement rocks. Our ultimate destination on the Rhine was an organ factory owned by one Richard Dott. Although we are not related, I do have reason to believe that my ancestors came from somewhere in the Rhineland. We know that they turned up in Scotland in the 1600s before one restless fellow crossed the Atlantic 200 years later.

Autumn found me helping to lead several field trips before going to the GSA meetings in Seattle. There we enjoyed seeing alumni too numerous to list here. I must mention one notable event, which occurred while I was touring the exhibits. I literally fell at the feet of departmental librarian, **Marie Dvorzak** to our mutual great surprise. The convergent junction between two carpets formed a treacherous fault scarp, which caught me unaware. In retrospect I see this as a fitting, if ungraceful, act because, like countless others folks, I am so deeply indebted to Marie for her always-cheerful help in our exceptional library.

Louis J. Maher

I taught my final Geol. 101 class during the spring term. On the last day I was surprised and delighted to find my three grown children (Jim, Rob, and Barbara) in the lobby outside AB20. They had arranged a surprise visit from, respectively, Rochester, MN, Bozeman, MT, and Fond Du Lac, WI. Later that afternoon the Department held a retirement roast for Jane and me, followed by a party on the fourth-floor balcony. Among the many guests was Regents Professor emeritus Herbert Wright, my PhD adviser from the University of Minnesota. Jane and I received a very generous gift from my colleagues that allowed us to purchase round-trip air tickets for a month's visit to France that took place during September. I also received the book *Terroir* by James E. Wilson (former Vice President of Exploration and Production at Shell Oil). At first I thought the title might have something to do with the world since 9/11, but quickly learned that "tair-wahr" involves the totality of factors (geology, climate, soils, culture, etc.) that go into making French wines. I read the parts that dealt with the regions we visited, and took advantage of the information. My colleagues wrote many personal comments on the end papers, and these I will always treasure.

Year 2003 was my last official year at the University of Wisconsin-Madison, but it also marked the start of construction on phase 1 of the West Wing (Weeks 3.) On April 21, 2003 I was able to sit down with Rick Neipert, representative of J.P. Cullen and Sons, Inc., the main contractor, to discuss the work that began a week later. I hope most of you are watching the construction on the department's web camera at http://weeks3cam.ssec.wisc.edu/webcam.html. Now that the walls are enclosed, the outside activities will slow, but you can download a time-lapse movie of the whole operation at http://www.geology.wisc.edu to get a good feeling for all the phases of construction. **Ben Abernathy** has taken over running the Weeks 3 Building Committee, and he is doing a superb job handling all the many details. How does it feel to have emeritus status in a great department? It feels good!

A Votre Sante! *Jane Maher toasts the photographer, her husband, Lou.They took a break at this at highway rest area as they traveled the wine regions of France in September.*

Gordon Medaris

2003 was another enjoyable and busy emeritus year, including participation in four conferences and publication of three papers (for those interested in specifics, see http://www.geology.wisc.edu/people/display.html?id=27).

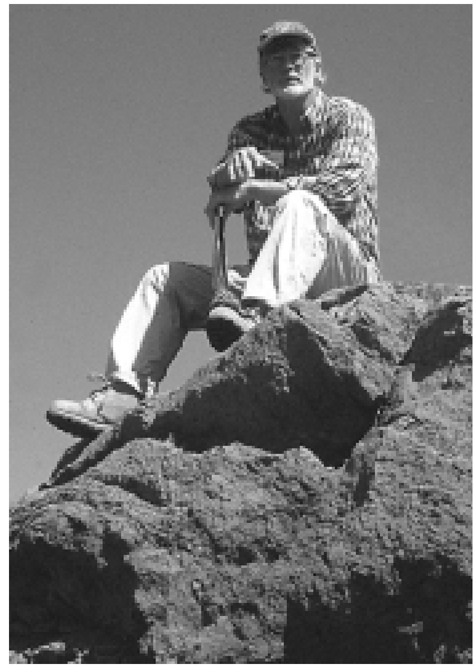
Early May found me in Iron Mountain, MI, at the 49th Institute on Lake Superior Geology, where **Bob Dott** and I reported on an extension of our Baraboo Interval studies with "The Sioux Quartzite revisited: sedimentology, metamorphism, geochemistry and the origin of pipestone".

In Late May I traveled to the Czech Republic to attend an international conference on the Variscan evolution of the Bohemian Massif, the title of which, "Geology Without

Frontiers", alludes to the exposure of the massif in five different countries, where four languages are spoken. A highlight of the conference was co-leading, with longtime colleagues **Emil Jelinek** and **Petr Jake** of Charles University, part of the field excursion to localities of high-pressure rocks in Moravia.

I returned to Europe in June to attend the Norwegian Eclogite Field Symposium in Selje, Norway, which was dedicated to the memory of Alice Wain, who was the first person to recognize and document the extensive occurrence of coesite in the Western Gneiss Region and who tragically died in a field accident not long after completing her PhD. I reported (with **John Fournelle, Tom Lapen**, and **Clark Johnson**) on the metamorphic evolution of a garnet peridotite in the Western Gneiss region, and **Hannes Brueckner** (Lamont-Doherty) and I were blessed with a rare sunny day in western Norway, as we led conference participants on an excursion of the Almklovdalen peridotite, which remains the world's most spectacular garnet peridotite.

My professional year closed with attendance at the Ernstfest symposium at GSA in Seattle, where **Tom Lapen, John Fournelle, Clark Johnson, Brian Beard** and I described the remarkable three billion year evolution of the Sandvik garnet peridotite, Norway. Nancy Korda has become very interested in archaeology, taking classes, going on digs, and volunteering in the Anthropology Department, so we took advantage of the GSA meeting to join a geoarchaeology field trip, on which we visited the controversial Kennewick Man site and several others.



Gordon Medaris, leading one of the field trips at the Norwegian Eclogite Field Symposium, Almklovdalen, Norway, in June, 2003. Photo, Herman van Roermund, University of Utrecht.

It's a Bird; It's a Plane; It's a Geologist

Lou Maher

This photo was taken at the Burley, Idaho, airport on the morning of April 14, 1966 by Charles F. Mansfield (one of our grad students) during a preflight check of the department's Cessna 170B (a four-place all metal airplane with conventional landing gear; i.e. with a tail wheel). It was called N2398D, which was its registration number. A preflight check is done simply to see that everything is OK before taking off. It consists of checking to see that all the parts are fastened on securely, that the oil and gas tanks are filled and properly secured. One usually checks the propeller to see that it is not scratched or chipped (that is what I am doing in the photo), and using the propeller to turn the engine over once or twice to see that it turns smoothly.

Preflighting N2398D. Photo,Charles Mansfield.

As background, I was working on a 43-lecture series for a television version of Geol. 101. The television at the time was black and white. If copyrighted material (photos and movies) were to be kept on tape, royalties had to be paid. I was going to spend a month out west to photograph my own material, but then I found out that the geophysics group had N2398D out at Morey Field in Middleton. They had purchased it on a grant to use it for aeromagnetic measurements. Since they were finished with their project, and I was a new pilot, I arranged with the university to use the plane for some of the pictures and movies for the course. Charlie Mansfield served as my project assistant working the cameras as I flew. I used the B&W TV tapes for several years, but by that time color TV had become the norm. Still the slides and movies were in color, and I used them throughout the rest of my career; they make up the bulk of my website "Geology by Lightplane" that others can download. <http:\\www.geology.wisc.edu/~maher/air.html>

Incidentally, I wrote a magazine article for the Aircraft Owners and Pilots Association (AOPA) about the flight to the West, and they have given me permission to "reprint" it at the Geology by Lightplane website. I am working on that today.

Alan Carroll is a pilot who is building his own plane in his garage. And Ben Abernathy is a pilot as well.