Dept of Geology and Geological Engineering

South Dakota School of Mines and Technology

Department Newsletter December 2004

Editor: Colin J. Paterson
Colin.Paterson@sdsmt.edu

501 E. St. Joseph Street, Rapid City, SD 57701
Web page: http://geology.sdsmt.edu/
(605)394-2461

Dr. John C. Mickelson

November 16, 1920 – March 27, 2004

Message from the Department Chair – Dr Arden Davis (arden.davis@sdsmt.edu)

With this newsletter, I regret to bring you the sad news that Dr. John C. Mickelson passed away on March 27, 2004 (see related story). From my own experience, I owe Dr. Mickelson a great debt because I wouldn't have undertaken the rigorous geological engineering curriculum if it hadn't been for his insistence, and I'm grateful to him because he pointed me toward a challenging, interesting, and rewarding career.

Dr. Mickelson had a huge impact on the department and the students who knew him. He helped build and maintain strong programs in the Department of Geology and Geological Engineering. He and his family were instrumental in establishing fellowships, scholarships, and a professorship at the School of Mines. Over the years Dr. Mickelson and his wife, Grace, quietly and often anonymously contributed to funds such as the fellowship in honor of his friend, Dr. J.P. Gries. We hope to continue his tradition of excellence and strength. Currently, the undergraduate program in geological engineering has about 40 students and the geology program has about 50 students, so continued scholarship support and recruitment of new students are of paramount importance during this time of change at South Dakota School of Mines and Technology. We thank the many alumni and friends who have contributed to these efforts.

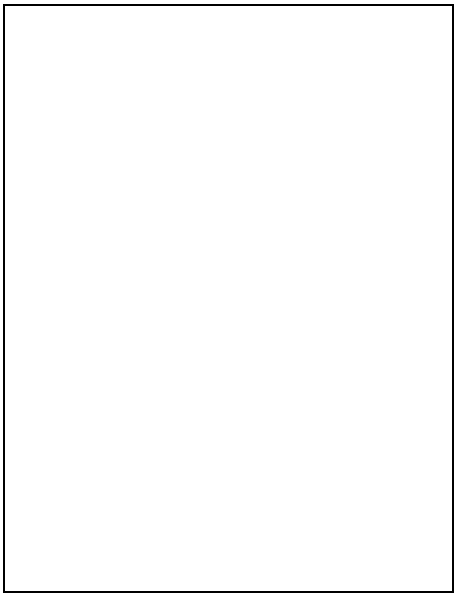
Since the last issue, we've heard from numerous graduates and friends, including Ray Wuolo, Creties Jenkins, Bill Gates, Jeanne Goodman, Randy Taylor, Brad Pekas, Janet Carter, Andy Long, Linda Foster, Diane Coker, Richard Arnold, Patrick Whalen, Steve Weisenberger, Jacob Porter, Roberta Gaines, Mike Elwood, Marshall Gries, Thomas Gries, Sherwin Artus, Whiting Petroleum, Frank Aplan, Gregory Turner, Dietrich Whitesides, Greg French, David Niven, Ken Luza, Christopher Bauer, Steve Bauer, Steve Sanders, Jim Bauer, Paula Bauer, Roy Roadifer, Tom Propson, Gary Larson, Tom Hennies, Elsie Kephart, Meddie Quaintance, Richard Schleusener, Don Thorson, Dave Strain, Ernest Van Gerpen, John Welch, Coral-Etta Stevens, Marilyn Butts, Kevin Vogel, Eva Rasmusson, Reuben Bareis, Donna Kennedy, V. Ramakrishnan, Howard Peterson, Myrna Coyle, Harold Safgren, Kathy Johnson, William Eschenbacher, Michael Keiffer, Duff Erickson, Arthur C. Johnson, Patricia Hole, Leon Nielsen, Ali Razavi, Bruce Stearns, Andy Farke, Daris Ormesher, Aaron Tieman, Cody Knutson, Becky Grambo, Micah Keller, Britt Machacek, Mike DeFea, Marc Macy, Alex Fisher, Matt Minnick, Lee Knudtson, Ann Curnow, Jonathon Brinson, Kimberly Butzin, Robert and Carolyn Odegard, and many others. If anyone was left off the list, I sincerely apologize. To all those who contacted us, made contributions, or otherwise lent your support, we owe you our thanks.

Please stay in touch.

Dr. Mickelson Passes Away

For the second time in a little less than a year, the Department of Geology and Geological Engineering has lost one of the giants in its history. Dr. John C. Mickelson passed away in his home on Saturday, March 27, 2004. He joined the faculty at the School of Mines in 1961, and became department head in 1968 after the death of Ed Tullis. Dr. Mickelson served ably as department head until 1978, and he retired from teaching in 1985 after 25 years of outstanding service to the School of Mines. Those who knew him will remember his gruff but friendly exterior, his sharp mind, his genuine concern for students, and his clear vision in emphasizing the soundness of a geological engineering education. Dr. Mickelson had a strong and enduring influence on his students, encouraging them to complete the rigorous engineering curriculum and in the process helping them discover that they could accomplish more than they realized they could.

We'll miss him greatly.



John and Grace Mickelson, January 2004.

This Newsletter

In order to save funds, this newsletter is on our web page (http://geology.sdsmt.edu). We are mailing this newsletter only to those of you (70%) for whom the Alumni Office does not have email addresses. If you received a printed newsletter, but you have an email address, please provide it to the Alumni Office (alumni@sdsmt.edu).

Professional Advisory Board

The geological engineering program's Professional Advisory Board met in Rapid City on April 27, 2004, in advance of our ABET accreditation visit last fall (see related story). Members of the board include Dr. William C.B. Gates (Kleinfelder Associates), Jeanne M. Goodman (S.D. Dept. of Environment and Natural Resources), Creties D. Jenkins (DeGolyer and MacNaughton), and Ray W. Wuolo (Barr Engineering Company). Board members attended the Engineering Design Fair and met as a group during the afternoon of April 27 to provide input to the program. We thank them for their service and for their willingness to travel to Rapid City to meet with faculty members and students.

ABET Accreditation Visit

The undergraduate geological engineering program was evaluated during fall, 2004, as part of the general review by the Accreditation Board for Engineering and Technology (ABET) for engineering programs at South Dakota School of Mines and Technology. Nine of the undergraduate engineering programs at the school were visited during October 17 to 19, 2004. We're happy to report that the geological engineering program received a very favorable review. The program was last reviewed six years ago, in 1998, as part of the institution's general visit at that time.

Alumni Honored

Outstanding Recent Graduates are honored annually during Engineers Week. Since 1988, eleven of our graduates have been chosen for this award by a campus selection committee. Some of the past honorees include **Rick Baker** (1988), **Terry Logan** (1989), **Creties Jenkins** (1993), **Brad Pekas** (1996), **Andrew Kaczmarski** (1998), **Randy Taylor** (1999), **Juan Villa** (2000), **David Tully** (2002), and **Janet Carter** (2003).

Dr. Andy Long was chosen as the Outstanding Recent Graduate in 2004. Andy received his B.S. degree in geological engineering in 1993, his M.S. in 1996, and his Ph.D. in 2000. At the U.S. Geological Survey's District Office in Rapid City, he quickly rose to the position of project chief, with responsibility for several major water-resources projects, including Rapid City's water supply from the Madison aquifer. He is the author of numerous peer-reviewed journal articles, U.S. Geological Survey water-resources investigations, conference papers, and final technical reports.

Hillari K. Clark has been selected as the Outstanding Recent Graduate for 2005. Hillari earned her B.S. degree in Geological Engineering at SDSMT in 1994 and her M.S. degree in 1997. She then accepted a position as reservoir engineer with CalResources (parent company, Shell Oil), and quickly rose in responsibility as team leader, including management of major development projects with annual budgets of $80,000,000. She currently is a development engineer for Aera Energy (formerly CalResources). She is the author of numerous reports, resource evaluations, and production plans.

Alumni in Touch

Chris Schmitz (B.S. GeoE 1983), Chief Geologist at the Phelps Dodge Bagdad porphyry copper-molybdenum mine in Arizona, organized a tour for the spring break trip group.

Britt Machacek (B.S. GeoE 1992) is working as a Senior Environmental Representative for Target Corporation in the Corporate headquarters in Minneapolis, MN.

Ryan Nupen (B.S. GeoE 1998) has been working as a construction engineer for the US Forest Service in Sitka, Alaska almost two years now and loving every minute of it.

Rebecca L. (Yost) Grambo (B.S. GeoE 1985) is still living in Canada working as a photographer and writer. "I celebrated the publishing of my 20th book, *Borealis*, this fall and have more on the go. Although I'm not actively working on geology, I am working on a book about the Wager Bay area of Nunavut, west of Southampton Island to the north of Hudson Bay. This is Canada's newest national park, Ukkusiksalik, and the geology is unbelievable. Very, very old rocks with a great variety of metamorphic features so clear that even I can tell what they are! Add some fantastic glacial geomorphology and it is truly an amazing place. Oh, and there are plenty of polar bears if the rocks get boring! My webpage is http://www.wildthreads.com/"

Jacob Porter (M.S. GeoE, 2000) is an engineer with Camp, Dresser, and McKee in Wichita (KS), and recently became registered as a professional engineer in South Dakota and Kansas

Current Enrollments (December 2004) and Recruiting Efforts

BS Geology	52	MS Geol/GeoE	14
BS Geological Engineering	42	MS Paleo	15
		PhD Geol/GeoE	11
BS Degree Total	**94**	**Graduate Degree Total**	**40**

In order to help with recruiting, we hired a part-time recruiter (shared with MetE and Physics) during Fall 2003 and Spring 2004 semesters. In Fall 2004, new freshmen enrollment was 12 GeoE and 18 Geol; this is an encouraging increase over previous years. One of the big concerns on campus is the desire to improve retention rates; in general, there is a significant loss of students by the junior year. We encourage our students to be involved in student chapters as a means of facilitating retention. Currently we have the Society of Economic Geologists, the Paleo Club, and the Association of Engineering Geologists. In the fall, we run field trips open to all students on campus, and have instituted an annual hike up Harney Peak. We produced glossy brochures for Geology and Geological Engineering for distribution by campus recruiters. If you would like to obtain some brochures for distribution to prospective students in your area, contact Colin Paterson (colin.paterson@sdsmt.edu) or Pam Fenner (pfenner@taz.sdsmt.edu).

Placement for our BS, MS, and PhD graduates has been excellent – in the past 2 years, about 95% are placed in jobs or graduate school. Increased activity in the last year or so in geotechnical engineering, petroleum, mining and mineral exploration, and coalbed methane has resulted in an increase in job opportunities. It is very important that students acquire summer experience in the industry to facilitate their obtaining a permanent job upon graduation – if any of you are in a position to hire interns, please let us know.

One of the major challenges for our graduate programs is maintaining a critical mass in our specialist areas. The Board of Regents requirement is that our graduate classes have a minimum of 7 students enrolled. In effect, this means that we need a cohort of 7-10 students every 2 years. With an apparent dwindling of applicants for graduate school, and no foreign students currently in our programs, it is very difficult to meet this requirement without major graduate fellowship funding. Faculty members continue to seek research grants for graduate student support, and state funds are also available for teaching assistantships, but in both cases, this is quite insufficient for full support of our graduate students.

How can you help the department?

- **Recruiting** – talk to high school students or clubs in your area, or help with SDSM&T recruiting fairs in your area. Contact Colin Paterson (colin.paterson@sdsmt.edu) if you can help, and if you would like a package of recruiting materials.
- **Give a presentation on your experiences to our students -** if you are returning to Rapid City for a visit, let us know, and we can arrange a seminar time or an informal meeting with students. We continue to have Friday Afternoon Seminars at 4 pm – the program is continually updated on our department web page.
- **Contribute tax-deductible gifts to SDSM&T Foundation accounts.** Send check, made payable to *"SDSM&T Foundation"* to SDSM&T Foundation, SDSM&T, 501 E. St. Joseph St., Rapid City, SD 57701. Make sure that you specify the department to be supported, and the appropriate scholarship and/or fellowship if you wish (see below). Alternatively, you may prefer to establish your own named scholarship or fellowship. Scholarships are for undergraduate students; fellowships for graduate students. If you have any questions about the donation, email foundation@sdsmt.edu, or phone (605)394-2436
- **List of scholarships and fellowships:**

D. Sherwin Artus Scholarship
Macy Baresch Scholarship
Jeff L. Bauer Memorial Scholarship
Edwin H. Bittner & John P. Campbell Memorial Scholarship
*Guy N. Bjorge Scholarship
*G. Gregory & Gertrude S. Bryan Scholarship
Carver-Cornelissen Scholarship
Joseph P. Connolly Memorial Award
Homer Davis Memorial Scholarship
Greg French Economic Geology Fellowship
*Erwin, Hazel & Richard Fuerstenau Memorial Scholarship
Geology and GeoE Department Scholarship
Geology and GeoE Graduate Student Fellowship
Geophysics Amoco Fellowship
John Paul and Virginia Gries Fellowship
John Paul and Virginia Gries Scholarship
James O. Harder Memorial Scholarship
Haslem Post Doctoral Fellowship
*Arthur (A.I.) & Willmeta Johnson Scholarship
Dr. Ray Lemley Memorial Scholarship
Fielding Bradford Meek Scholarship
John C. Mickelson Fellowship
Perry H. Rahn Scholarship
Roadifer Scholarship
Bill Roberts/Western Dakota Gem & Mineral Society Scholarship
*Leslie and Valeta Roggenthen Scholarship
*A.L. & P.M. Slaughter Memorial Scholarship
*Jane Speice Memorial Scholarship

** all mineral industry departments eligible (including MinE, MetE)*

Distinguished Visiting Lecturers

Dr Allen Shapiro (U.S. Geological Survey) visited in March 2004 as the Darcy Distinguished Lecturer for the National Ground Water Association. He presented a seminar on "Characterizing Ground-water Flow and Chemical Transport in Fractured Rock".

Dr Jeff Keaton (Association of Engineering Geologists – Jahns Distinguished Lecturer) presented an informal lecture, "Soil Stratigraphy and Surface-water Hydrology", and a formal lecture "Engineering Geology Mapping in the Information Technology Age", in April 2004.

Dr Emi Ito (geochemist, University of Minnesota – St. Paul) presented a lecture on "Extracting Climate Story from Lake Sediments – Multiple Processes and Multiple Proxies" on November 12. Dr Ito was sponsored by the Association of Women Geoscientists.

Dr Francois Robert (Chief Geologist, South America, Barrick Gold Corporation) visited during November 14-16 as the Society of Economic Geologists Thayer Lindsley Visiting Lecturer. He presented an informal overview of the current status of the minerals industry, and a formal lecture on "Geology and Setting of Gold Deposits in the Carlin Trend, Nevada. He also discussed potential research collaboration with graduate students and faculty.

Dr Philip Currie (Royal Tyrrell Museum of Paleontology, Drumheller, Alberta), the 2004-2005 AAPG Distinguished Lecturer, presented a lecture on "Feathered Dinosaurs and the Origin of Birds" on December 7.

Carries Herbel Receives Virginia Simpson Award

Ms Carrie Herbel (Collections Manager and Preparator, Museum of Geology; Instructor, Dept of Geol/GeoE) received the Virginia Simpson Award at the SDSM&T Honors Ceremony on March 23, 2004. This award is open to any SDSM&T faculty or staff member. This award, with a cash stipend, was established by Mrs. Simpson to recognize and encourage involvement by SDSM&T faculty or staff with the Rapid City community. This involvement may be through participation in community activities, social services, and/or volunteer services, etc. Mrs. Simpson's intent is to encourage new or continued involvement in the local community. Carrie exemplifies this vision by her outreach activities and goals for educating young women in science. She has conducted numerous "pep" talks for Middle to High School aged students in the region, with the latest occurring in Hot Springs this past March. Over 100 young high school women attended this science conference and Carrie presented four sessions to encourage these women to pursue their goals. With the support of the SDSM&T Paleontology Club, whom Ms. Herbel is the faulty advisor to the Club, many students conduct outreach activities with local schools. This has been extremely successful. Carrie is also active with local diabetes support groups in developing more fulfilled lives of those with this disease.

Also, Carrie has spearheaded various activities within the Museum of Geology to encourage the public become aware of what the Museum can do for them. Open Houses and Rock & Fossil Identification Sundays are a popular activity bringing in those that were unaware of the Museum.

And finally, Carrie has dedicated her educational efforts to encourage and support undergraduate and graduate students to complete their education and find the appropriate place for them career-wise. Many of these students are now placed in jobs around the United States.

Carrie Herbel Graduates from Leadership Rapid City - 2003

In November 2003, Carrie graduated with 29 other participants in the Leadership Rapid City course. This 12-week course begins in September and exposes participants to all aspects of how Rapid City is run. From learning the importance of Ellsworth Airforce Base to the Cornerstone Mission, graduates of the program tend to be strong activists in bettering the community. Support for Carrie to attend this class came from Dr. Karen Whitehead, Vice President of Academic Affairs and a scholarship from the Program.

SD Board of Regents Award for Academic Excellence

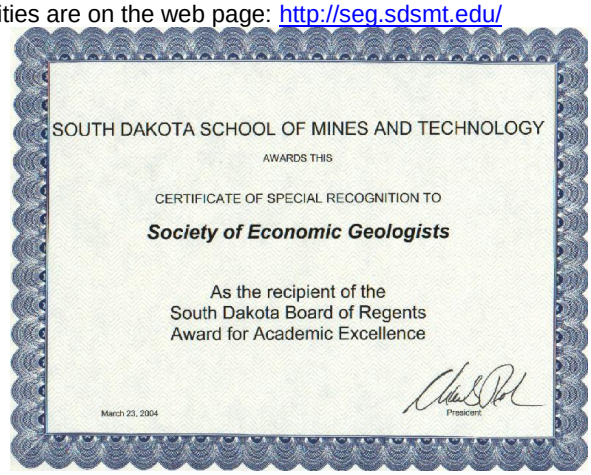
The SDSM&T **Society of Economic Geologists Student Chapter** was presented with the South Dakota Board of Regents Award for Academic Excellence for student organizations at the Annual Honors Ceremony at SDSM&T on March 23, 2004, and again at the Board of Regents meeting at SDSM&T in November. The award recognizes the chapter's involvement in conducting a weekly seminar series, sponsoring field trips to mines for students, marketing of Homestake rock suites to universities around the world, and providing outreach services in school classrooms in the Rapid City area. Chris Pellowski (past-President), Megan Smith (President) and Becca Burrows (past-Treasurer) received the award on behalf of the chapter from Dr Harvey Jewett, President of the Board of Regents.

The SEG student chapter continues to sell suites of rock and ore from the Homestake gold mine around the world. The chapter has been conducting outreach to local schools, raising funds through raffles at the local Darton Society, and conducting field trips. Twenty-five attended the field trip to the Pacer Minerals mica mine between Hill City and Custer. Pacer is owned by Duff Kruse (ME,1966), who kindly guided us through the mine and the feldspar and mica mills in Custer. Only two students and Colin Paterson were able to get up early enough to go on the trip to the Power

Resources solution mining uranium operation at Smith Ranch-Highland, north of Douglas (WY). Greg Kruse (Geol MS 1997) gave us a great tour of the area and the extraction plant.

Information on the suites and other chapter activities are on the web page: http://seg.sdsmt.edu/

Chris, Becca, Megan, and Dr Jewett



2004 Spring Break Trip to SW USA

Dr Colin Paterson and Dr Maribeth Price led 16 students in 2 vans and a pickup on an 8-day trip to New Mexico, Arizona, and Utah during March 6-14, 2004. Once we were past Lusk (WY) the weather was perfect for the rest of the trip, and we camped every night after the first night in a motel in Raton. Highlights were visits to Capulin National Monument (NM), Petrified Forest and Painted Desert, Montezumas Well and Montezumas Castle, the Bagdad porphyry copper-molybdenum mine, the Grand Canyon, Monument Valley, and Arches National Park (UT).

Mather Point, Grand Canyon

An arch near the campground, Arches National Park

Chris Schmitz [GeoE 1983], Chief Geologist with Phelps Dodge, gave a great tour of the Bagdad mine and mill as well as a visit to an old copper-zinc massive sulfide deposit adjacent to the current mine. At the Grand Canyon, 2 students made it to the river on the Bright Angel trail, and 2 other students and the 2 faculty ventured as far as Plateau Point overlooking the inner canyon. The upper part of the trail was still quite icy, requiring crampons to be worn!

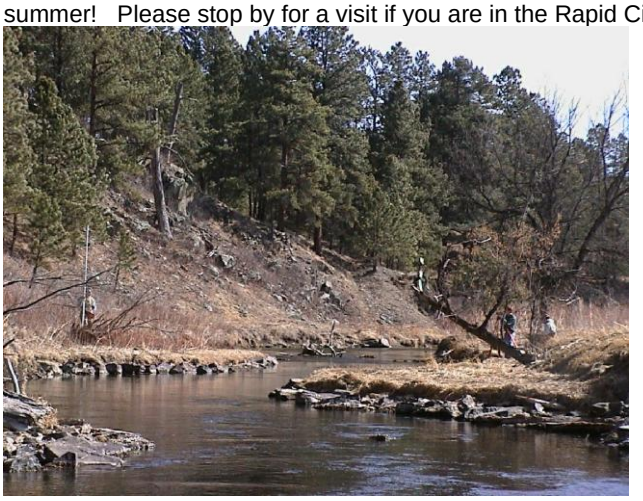
(Right) Bagdad Cu-Mo mine – Chris Schmitz is 5th from left.

News from Larry Stetler

Both spring and fall 04 semesters were busy times. I taught 4 courses in the spring and 3 in the fall plus made 4 trips to meetings in the spring, 2 of which involved student presentations at paper competitions, and 2 meetings and 1 workshop in the fall. I am happy to report that in both instances involving student presentations, the Rocky Mt. Section of AEG Student Night and the SD Association of Environmental Professionals Student Paper Competition, Elizabeth Roeser, a M.S. student in GeoE won 1st place! She presented results from her thesis on physical characterization of South Dakota watersheds and graduated in May 04. In June, she presented at the ASCE Hydrology Conference in Denver, CO.

I had 3 papers accepted for publication during the spring 04 semester plus 2 additional that were published. The 3 new papers are on various aspects of curricular development and assessment techniques (all having been published by this writing), both topics I have become increasingly active in as part of my duties as coordinator of the 1st-year engineering program at Tech.

My research continues to progress, primarily through my students that are working on 1 Ph.D. and 4 MS projects. I am continually trying to support them at a level that allows the work to move forward--a most challenging situation. I have acted as consultant for the SD Dept. of Game, Fish, and Parks on 3 different projects over the past year involving aspects of stream geomorphology and hydrology. Senior GeoE students in Geological Engineering Design II worked on 1 of these projects in spring 04 in Rapid Creek below Pactola Dam to design a flushing flow for trout habitat maintenance. This project will be continued in spring 05. Lastly, I have been involved in 2 workshop meetings since last summer with the conversion of the old Homestake gold mine into a Deep Underground Science and Engineering Laboratory (DUSEL). We are hoping to have a first instrumentation package underground as early as this coming summer! Please stop by for a visit if you are in the Rapid City area.



Students surveying in Rapid Creek for a design project to remove fine sediment from trout spawning habitat.

News from Perry Rahn

Dr. Perry Rahn, Prof. Emeritus of Geology and Geological Engineering, participated in a symposium at The 89th Annual Meeting of the South Dakota Academy of Sciences in Oacoma on April 2-3, entitled "Recovering Lewis and Clark's River: Today's Perspective on the History, Management, and Ecology of the Missouri River. Dr. Rahn's presented his thoughts in a paper entitled "Fluvial Processing and Recreational Opportunities of the Lower Missouri River".

Dr. Rahn was honored at the evening banquet as newly-elected fellows of the Academy.

Perry gave an invited paper on "Site Characterization for Flood Hazards" at the annual meeting of the Association of Engineering Geologists in Detroit. He also stays active with ground-water work in the Black Hills area. During the last 2 weeks, Perry ran a pumping test with a Ph.D student, and he put a gallon of red dye in to a gypsum sinkhole in the Spearfish Fm. Perry said the dye hasn't showed up yet.

Remote Sensing Research in Namibia

Dr Colin Paterson and Dr Ed Duke spent part of July and August 2004 undertaking their international initiative in Namibia. This was their third visit in the last four years as they close out their current NSF International Program Grant on "Potential of Hyperspectral Remote Sensing to Mineral Exploration: applications to arid terranes in Namibia." Paterson and Duke received travel and accommodation support from NSF for faculty and graduate students to go to Namibia and for collaborators with the Geological Survey of Namibia (GSN) to travel to Rapid City. One masters thesis at SDSM&T has been completed from the first visit, and a Ph.D. dissertation is in progress from the latest visits to Namibia. In addition, two graduate students from SDSM&T have accompanied Paterson and Duke to Namibia, and one Namibian student studying in South Africa visited Rapid City. The GSN has provided Duke and Paterson with logistical support in Namibia including provisions of a four-wheel-drive vehicle, gas, office, geological maps and data, field equipment, and liaison with companies in Namibia.

This collaboration has been a good one – both parties have benefited greatly. The GSN has funded collection of satellite/ high plane data in areas of interest, and we are currently providing personnel at the GSN with training and assistance in processing and interpretation of data. This summer, we were elated to find that the GSN had flown about 5 areas of interest in the Damaran terrane. This allowed us to compute mineral maps, followed by visits to the sites to field check our processing. The results were exciting; our predictions of distributions of minerals and rocks, alteration and structures turned out to be excellent. The areas included an active gold mine, Navachab, and a gold prospect, Erindi.

News from Colin Paterson

I continued to be involved in the Black Hills Science for Teachers (BLAHST) NSF program with BHSU, offering workshops for teachers during the academic year and summer field workshops on "Geology of the Black Hills and Badlands" and "Ecosystems". Dr Price and I have a senior student working on producing a CD on the Geology of the Black Hills workshop for her senior thesis.

I also directed the summer field camps; this year there were 25 in the GeoE camp and 15 in the Geol camp, both at Ranch A. We introduced a new geology camp in Taskesti in western Turkey, organized and taught by Dr Nuri Uzunlar (PhD Geol 93) with assistance from Dr Alvis Lisenbee. This was a pilot project to assess the viability of Turkey camps for the future – the 7 students (only 1 from SDSM&T) were unanimous about the value of the geological and cultural experience. Alvis and Nuri presented a paper on the Turkey camp at the Annual Meeting of the Geological Society of America in Denver in November. We used this venue to promote the camp for 2005, and we hope to double our enrolment.

A web page on Black Hills Industrial Minerals was an outcome of the MS research by Krystal Price (MS Geo, 2003). She was assisted by Linda (Heindel) Foster (BS GeoE, 03) and Josh Price (BS, MinE 03). Funding was provided partly by Rapid City Economic Development, through Bob DeMersseman, and partly by Dr Sherry Farwell, Dean of Graduate Education and Research. This is a searchable database of resources in the Black Hills, including metallic deposits, and it is hoped to be an information resource for future entrepreneurial activities in this region. The web page is located at: http://bhminerals.sdsmt.edu

Along with Drs Price and Lisenbee, I am planning a spring break field trip to southern Spain for March 3-14, 2005. Visits are planned to the classic base metal and precious metal mining district of Rio Tinto and the mercury district of Almaden. There are 21 students, faculty and alumni participating. If you are interested in future overseas spring break trips with the department, let me know, and I will alert you to the plans. Information about our Spain trip is on my web page http://speedy.sdsmt.edu/~cpaterso

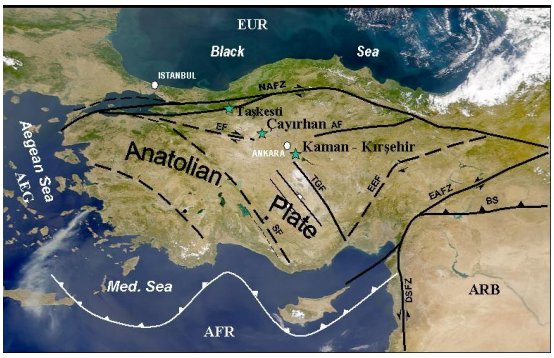
News from Alvis Lisenbee

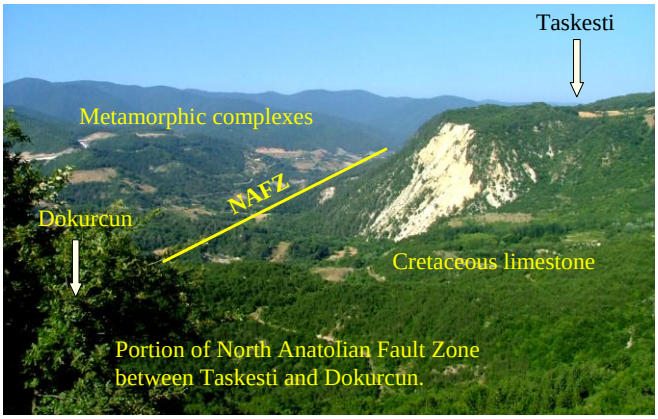
International Geology Field Camp: June 21 to July 23, 2004 : In early June I traveled to Turkey for a bit of vacation followed by two weeks of participation in the first SDSMT International Geology Field Camp. The vacation was along a portion of the Aegean coast which 28 students and staff visited on the Spring Break field trip in 2000. Neither European nor Turkish tourists had arrived in early June and Kathleen and I had Troy, Ephesus and Pergamum pretty much to ourselves.

Subsequently Dr. Nuri Uzunlar and I spent a week examining potential study sites for the field camp across the northern Tethyan suture belt. The operating base for the camp is in the small countryside town of Taskesti, located about 150 km east of Istanbul along the North Anatolian fault (essentially a twin in size and offset to the San Andreas fault). The facility in which we stayed there was provided by the General Directorate of Turkish Disaster Affairs – Earthquake Research Center. We examined the dissimilar terranes across the North Anatolian fault, which offsets the older Tethyan suture, as well as deformed early Tethyan island arc deposits, Cretaceous skarns around subduction-related granites in central Turkey, and coal deposits in the folded and faulted, post-Tethyan Haymana basin.

I returned to the U.S. following the first week of camp and Nuri had the thrill of four more weeks of geology, culture, and great food. The countryside visited during the camp included the green mountains of the north (it looks like

New England), the wheat-covered prairies of central Anatolia south of Ankara, and the arid, southwest U.S.-looking Haymana area. The students became a local item in Taskesti, visiting wedding feasts, dances, and picnics in the high mountains. Nuri is an excellent guide to things Turkish and was especially adept at providing tasty grazing materials throughout the camp. Interestingly, the students, who came from universities across the U.S., did not want this camp to end. Several of them remained an additional week as tourists traveling on their own. We hope to do the second international field camp this next summer.





Black Hills Development Corridor: Faculty members and students continue our study of the Black Hills Development Corridor. This year we completed geologic mapping of the Blackhawk Quadrangle (the quadrangle undergoing the most rapid urbanization in South Dakota) north of Rapid City and advanced the work on the Hermosa Quadrangle south of Rapid City. Dr. Davis and I continued the aquifer vulnerability study of the Rapid City West Quadrangle. Funding for the work is provided by the West Dakota Water Development District and the U.S. Geological Survey EDMAP program. The South Dakota Geological Survey (especially Mark Fahrenbach, Foster Sawyer, and Derric Iles) is very supportive as well, and publishes the geologic quadrangles.

We are preparing a Geologic Atlas of the Rapid City West Quadrangle to include maps showing economic resources (Colin Paterson), geologic hazards (Larry Stetler, Bill Roggenthen, and the M.S. candidates Brad Stock and Brenda Manley), aquifer vulnerability (Arden Davis: Two students, Scott Miller –Ph.D. and Reko Hargrave – M.S., are nearing completion of their theses on the Madison and Minnelusa aquifers.), and depth to aquifers, as well as the geologic base maps. The GIS lab headed by Maribeth Price is an integral part of this effort. Bryan Guthrie, a M.S. student, is conducting an interesting magnetic study seeking to locate underground karst passages partially filled by magnetite-bearing sands introduced through stream swallow. Megan Ransom, an undergraduate student is preparing a catalogue of reported septic tank spills and other environmental problems related to water in this area of urbanization.

News from Maribeth Price

Geographic Information Systems (GIS) continues to grow at SDSMT. Dr. Price is now teaching the introductory course every semester, and more than 60 students took it last year, with about that many anticipated for this year. As usual, the quality of student GIS projects in classes is very high. We will be renovating the GIS lab this summer to upgrade the computers and develop a more effective teaching space, including a projection system. We purchased a large color scanner last spring that is proving quite popular all over campus, and is providing valuable assistance on graduate and faculty research. Dr. Price is currently working on the revisions for her second edition of *Mastering ArcGIS*, an introductory GIS textbook published by McGraw-Hill, and it should be available in Fall 2005. She also recently received word that the first edition is scheduled for translation into **Chinese**!

News from Jack Redden (emeritus professor)

Believe it or not, I'm turning into a paleontologist – Precambrian, of course. I have been working for the past several months on "fossils" in the quartzites of the Johnson Siding area. Don't ask me what they are but they should be at least 2 Ga old and possible older. They're 3-dimensional, some look like "eggs" and some are quite large (20 cm across). There may be more than one "critter". I'd appreciate any info any of you have about critters this old. Ciao.

News from Gale Bishop

Gale Bishop, Director of the Museum of Geology and Professor of Geology, (BS '65, MS 67) has been funded by the Bureau of Indian Affairs for an additional $61,121 to bring three year support for the "Assessment of the Standing Rock Paleontological Resource" to $122,121. The St. Catherines Island (GA) Sea Turtle Conservation Program has funded a graduate teaching/research assistantship for $9,600 to support an MS Paleontology student for 2004-2005 and the St. Catherines Island Foundation will again support $3,000 in summer salary for a sea turtle intern to operate the project. The 2004 Sea Turtle Program trained another 14 teacher-interns in conservation of loggerhead sea turtles. Bishop joined colleagues K. A. McCarville, Dale Springer, and Judy Scotchmoor in producing the South Dakota Geology section of PaleoPortal (http://www.paleoportal.org/). He chatted with USGS Director (and graduate school colleague) Chip Groat at SVP about possible USGS support for training Native American Paleontologists and also had the pleasure of visiting briefly with Ms. Robbie Gries, President of AAPG.

"A Dinosaur Expedition to Antarctica" by James E. Martin
(article to appear in February Geotimes)

In December of 2003, a remarkable expedition was taken to the ends of the earth to the southernmost continent of our world, Antarctica, in search for fossil remains. The National Science Foundation of the United States of America and the Museo de La Plata and Antarctic Institute of Argentina supported an expedition of scientists, under the direction of Judd Case from St. Mary's College, California, myself, Jim Martin from the South Dakota School of Mines and Technology, and Marcelo Reguero from the Museo de La Plata.

Our initial goal was to survey the Antarctic Peninsular area in hopes of finding fossils that could solve a long-standing question. How did marsupial mammals, the pouched mammals such as kangaroos, get to Australia, particularly because marsupial origin appears to have been in northern reaches, probably North America. So, how did these creatures that appear to have their early history so far north, become isolated on the island continent of Australia today? One hypothesis is that during the Late Cretaceous, sometime between 65 to 75 million years ago, a dispersal route extended from North America through South America, across Antarctica, and into Australia. The purpose of this expedition was to investigate an area on the Antarctic Peninsula to prove whether or not this migration route might have existed. The area targeted to recover fossils was on Vega Island east of the Antarctic Peninsula where our previous expeditions in 1998-99 resulted in the discovery of a hadrosaurine dinosaur tooth by Dan Chaney of Smithsonian Institution. The earliest appearances of hadrosaurines is in North America, and the hadrosaur tooth suggested that a dispersal route existed during the Late Cretaceous. However, one tooth, although extremely suggestive, was not enough evidence to definitively prove our hypothesis. Therefore, the 2003 expedition was outfitted to return to Vega Island in hopes of finding the elusive marsupial mammal.

So, just before Thanksgiving, members of the expedition crowded on a research vessel, the Lawrence M. Gould, in Punta Arenas, Chili, for the voyage across the Drake Passage to Antarctica. The Drake Passage has the reputation of being one of the roughest crossings in the world; we were not disappointed. Four days and queasy stomachs later, we arrived on the east side of the Antarctic Peninsula, but icebergs had blown into the Antarctic Sound preventing us from getting all the way to Vega Island. We revised our schedule and headed for Palmer Station on the western side of the Antarctic Peninsula. On the voyage along the western side of the peninsula, we found the scenery to be fantastic, with iceberg-filled seas and islands possessing magnificent glaciers extending down to the sea. We saw seals, whales, penguins, and many seabirds. The weather was fantastic on this side of the peninsula, but we knew we had to return to the stormy eastern side. Once again, the Antarctic Sound was choked with icebergs, but our captain, Mike Terminal, maneuvered carefully though the iceberg fields, took a different route through the islands, and arrived in Herbert Sound of the Weddell Sea. We steamed toward Vega Island, but soon found the sea was still frozen. Our ship was not an icebreaker but was rated to break foot-thick ice. So, we began the process of breaking our way toward Vega. We often would get stopped by the ice, go into reverse, and plow ahead until we were stopped again. The ice became three to four feet thick, and finally we realized we could not make it to Vega Island. Our spirits dropped because we could see the island only a few miles ahead. Then the ship got completely stuck. The crew tried many times and methods to free the ship, everything from attempting to tilt the ship to utilizing the fire hoses filled with seawater to melt the ship out. All during this time, we thought of the stories of Ernest Shakelton and his miraculous survival. Four hours later, the ship was freed, and we returned to open water. Now, we had to decide our next course of action as it was now apparent that it was impossible to return to Vega Island. Our only recourse was to offload onto a nearby island, James Ross Island. A northern peninsula, the Naze, possessed Late Cretaceous rocks, but they were

deposited in much deeper marine environments compared to those at Vega Island. This meant we probably would not find any terrestrial creatures, and we would have to be content with marine reptiles and invertebrates.

The closest site where we could offload from the Zodiacs was four miles from the Naze, and due to the shallow sea, was two miles from the ship. We established camp, putting up cook tents, wash tents, storage tents, bathroom tents, and sleeping tents. Following the daunting task of erecting a camp that would sustain us against the Antarctic weather for the next month, the ship disappeared, leaving us with a feeling of abandonment, which was quickly replaced by awe for the striking beauty around us. Our new home was comfortable, and we found our Scott

Jim Martin and expedition colleagues

Setting up camp

tents (named for the Antarctic explorer, Robert Scott, who froze to death in one) sturdy enough to withstand the harsh wind and snow. Very often, we would awake to three to six inches of snow covering the camp (which was christened Camp Slap Ya Mama for a Cajun seasoning that became very popular at mealtime). The dryness of Antarctica caused the snow to sublimate, and normally only a single field day was lost following snow storms. Camp life was comfortable, considering we were living in tents. The food was very good, and consisted of actual food, not the freeze-dried variety. We kept fresh meat in snowfields and derived our fresh water from snow melt. Camp life was usually fun and often when we were snow-covered, we read, played games, and in particular, fulfilled our obligation to scientifically document and conserve the fossils we had found.

The areas we wished to survey for fossils were four miles away from our camp. Everyday, we would hike at least eight miles to the Naze and back. Sometimes we would return to find our morning pathway had floated out to sea! We had hoped to find fossils from the Cretaceous marginal marine sediments but relatively few specimens, even marine reptiles were encountered in the argillaceous sandstones. Day after day, we found little, we tired and ached, and began feeling our expedition would result in failure. But one afternoon, our luck changed!

Judd Case went ahead of the group, and radioed me to join him to inspect a fossil he had recovered. I hiked to the site and found Judd holding several bones of a medium-sized fossil reptile. We were working in marine rocks, but the bones looked nothing like the mosasaurs and plesiosaurs we had found previously. We all wanted to exclaim, "dinosaur," but finding a dinosaur in relatively deep marine environments was definitely unexpected. Finally, a diagnostic toe bone was recovered, and we all had to admit, as one graduate student proposed, that we had found a dinosaur! We collected all we could before day's end and headed back to camp elated. The entire camp took on a new attitude; no longer was fatigue and pain a factor, now we looked forward to recovering more of the creature. For the next several days, we returned to the dinosaur site and scoured the surface; we also screened the loose material within a 100-foot radius from the find. As a result, we found much of the lower legs, parts of vertebrae, cranial material, and some fragmentary teeth. In the field, the elements appeared like those of a theropod dinosaur, but the foot structure seems very primitive for a carnivorous dinosaur existing at the end of the Mesozoic. Removal of the fossils from the rock is underway in our museum laboratory so comparisons with known meat-eating dinosaurs may be expedited.

Overall, we were very happy with our results. The dinosaur does not appear related to North American dinosaurs like the hadrosaur we had found previously. The new dinosaur appears to be a primitive holdover of the original Gondwanan dinosaur assemblage that existed before the dispersal route was established. Therefore, based upon the occurrence of the duckbilled dinosaur and the new dinosaur, we believe that the Antarctic fossil assemblage at the end of the Cretaceous is an amalgamation of endemic taxa as well as those that dispersed from North America, through South America and on to Antarctica. If dinosaurs could made the sojourn, we feel that marsupials were walking in their footsteps, and the modern birds, which occur in abundance in Antarctica before anywhere else in the world, may very well have been going the other way, migrating northerly along the coast to areas such as New Jersey, where they are rarely encountered.

Overall, the expeditions of 1998-99 and 2003 to the continent of Antarctica where penguins and seals now exist, has brought us great information that has shown that world, and particularly Antarctica, was much warmer around 70 million years ago compared to the present. In Late Cretaceous, Antarctica may have been a route of interchange for life between the Americas and Australia just before the end of the Age of Reptiles. As a result, endemic and immigrants

were interacting, but they had only a short time before the terminal Cretaceous extinction that destroyed the dinosaur assemblages. The modern birds and probably marsupials survived to colonize the post-Cretaceous landscape.

More News from Jim Martin

Jim Martin has been very busy since the expedition to Antarctica last year from before Thanksgiving until after the New Year. The expedition was very successful in the cold south, finding an unusual meat-eating dinosaur that made headlines. The National Science Foundation flew Jim and his colleague, Judd Case, to Washington DC where they held a press conference at the National Press Club. The story went worldwide, even to the Middle East and Australia. In the spring, Jim and Dave Parris from the New Jersey State Museum moderated two symposia concerning the geology and paleontology of the Missouri River, following in the footsteps of Lewis and Clark. The symposium was presented in Chamberlain along the Missouri River for the SD Academy of Science and in Boise, ID, at the Geological Society of America regional meeting. In May, Jim led the annual trip to Fossil Lake, OR, where he enjoyed the field work and the student company. During the summer, Jim and Judd went back to Australia to continue collaboration with colleagues in Brisbane and Adelaide. Their paper concerning the oldest lizard genus from Australia came out in June. Also in June, the state geological map was published--a project done with friends and former students, Foster Sawyer and Mark Fahrenbach (see below). Jim also arranged the receipt of an important collection of Badlands fossils made in the 1930's thanks to the generosity of Virgil Butler's daughters. During the summer, Jim continued work along the Missouri River with students and colleagues Dr. Andrea Concheyro and Dr. Marcelo Reguero from Argentina. During the fall semester, Jim was invited back to Washington by the National Science Foundation to sit on a panel to judge proposals. In December, Jim was chosen for an SDSM&T Distinguished Alumni Award, one of five being presented at the December graduation ceremony. Now he is gearing up for another trip to Antarctica from January to mid-March.

South Dakota Geologic Map Published

In the fall, the South Dakota Geological Survey unveiled the new 1:500,000 Geologic Map of South Dakota, coauthored by James E Martin, J. Foster Sawyer (MS Geol 90), Mark D. Fahrenbach (PhD Geol 95), Dennis W. Tomhave, and Layne D. Schulz. The map is the product of about 20 years of mapping and compilation by SDGS geologists, and SDSM&T faculty and graduate students. The SDGS prints the maps on demand. You can view the map and place orders at the SDGS web site - http://www.sdgs.usd.edu/

Dept of Geology and Geological Engineering
South Dakota School of Mines and Technology
501 E. St. Joseph St., Rapid City, SD 57701