PC Basement

THE COLORADO COLLEGE GEOLOGY DEPARTMENT

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Cover Photo:

Professor Christine Siddoway at Garden of the Gods enthusiastically lecturing to the FYE about the high gradient alluvial fan deposits of the Fountain formation deposited during erosion of the Ancestral Rockies. Photo by Dirk Rasmussen.

The Precambrian Basement
2012-2013

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Letter from the Chair

Hello Everyone! Welcome to a new edition of the Precambrian Basement. As usual there are updates from alumni and faculty, stories from students, and other goings on in the department, and I am sure you don't want to read a long-winded 'letter from the chair'. So let me just highlight a few things you don't want to miss in this edition, let me say a few thanks, and then you can get to it!

Our biggest, late-breaking, news is that Megan Anderson was granted tenure and promoted to associate professor at the end of 2012. We are all very proud of the tremendous amount of effort that Megan puts into her job as teacher and researcher on a daily basis, and we are very excited that she will be an integral part of the department for the long haul. Congratulations Megan!! On the other end of the faculty-age spectrum, 2012 saw Eric Leonard agreeing to become director of the Southwest Studies Program here at CC. This keeps him from teaching geology courses more than he would like, but I think Southwest Studies will benefit a great deal from Eric's experience and we wish him well. And speaking of new, or renewed, responsibilities, Jeff Noblett is serving his last year in the dean's office and will be enjoying a much-deserved sabbatical next year before rejoining the department. As for the rest of us, we are doing our usual mix of research and teaching, although Paul, and especially Christine, seemed to have been tapped to serve on a whole bunch of committees as we work with the new President of CC to plan for the future. It is great to know that our faculty are sought-after and respected by their colleagues, and we should be proud of that.

When it comes to students, they continue to be full of enthusiasm and smarts (just like you were in college!). Most are involved in research projects, either with CC faculty, with the Keck Geology Consortium, or with other REU (Research Experience for Undergraduates) groups, and it is great to watch them grow intellectually. We had a bumper crop of sophomores in geology classes this year, and although it will be a challenge to keep them all occupied moving forward, it is great to see so much continued interest in the major.

As for thanks, once again the paraprofs Dave and Dirk have done a great job getting this edition of the PCB to press. This is only a small part of their workload, and we thank them for all of their efforts on a daily basis that make our classes function at such a high level. We had a new visiting faculty member in the department this year - Christian Schrader. Christian is a real-life igneous petrologist, and he has already taught volcanology and igneous petrology to a large number of students, not to mention several sections of GY140. For all of this, we offer him a round of applause. Zion Klos ('09) took over teaching our summer introductory geology course, and I don't think the students spent more than a couple of days inside, so thanks to Zion for keeping it real. And as usual no 'thanks' would be complete without thanking Steve Weaver and Mandy Sulfrian for all of their hard work on a daily basis. We would be lost without them.

I'll end this letter much as I did my letter last year, and that is by saying that one of my highlights was visiting with alums at the AGU meeting in December and catching up on careers, interests, home lives, etc. Once again I think I speak for all the faculty members when I say that these 'family reunions' are special to us, and I would like to encourage all of you to keep on sending updates – we really do love to hear from you!

Have a great year!

Henry Fricke
Geology Department Chair

MEGAN ANDERSON
(Geophysics)

Summer seems so long ago, yet so much happened! I was co-teaching a course for Colorado Springs district 11 science and math teachers in the MAT program when Colorado Springs caught on fire. It was quite the time of strong emotions and disruption to our lives—more so because all of my students were from Colorado Springs and had been for years, so have strong ties to the community. We struggled through that time, all of us coming through in the end. I think I learned just as much from my co-teachers Sandie Gilliam (Education Department) and Sunil Chetty (CSB/SJU mathematics professor) and from my students (about K-12 education these days in the public schools) as they must have learned from me.

In July I traveled to Costa Rica with a student (Peter Levin '15) to assist Esteban Gomez from the Anthropology department pre-surveying new archeological sites on the Nicoya Peninsula. It was a good learning experience, though we're still trying to figure out how useful our data will be. Though most of the peninsula is made of marine sandstone and limestone, there is also plenty of basalt in the area—so our magnetic survey technique might be telling us more about geology than about the layout of buried villages! Given the results from the test pits dug during this first summer, it's likely I will head back this coming summer to see what we can do with resistivity techniques. A few days after returning from Latin America I headed to Scandinavian America (Minnesota) to bicycle 250 miles in northern MN with my parents and husband—the journey was a benefit ride for the MS Society, and I'm proud to say that my team raised the most money of all the participating teams!

Finally (yes, we're still on summer), I headed to Seattle to gather new data in support of a colleague's geologic mapping and to fill in the final data in support of a new computation for the depth of the Seattle basin, after 7 years of data collection in the area. Sarah Geisse ('13) assisted in the field and intended to use the data for her senior research project. However, for those of you who know Melvin (the gravimeter), you'll appreciate that he's a temperamental beast and he "blew a gasket" in the field. No, it wasn't quite as catastrophic as it sounds, but Melvin did need to go to the hospital (a.k.a Lacoste and Romberg Meter Repair), so we lost our data. Oh the travails of technology. Not to worry, Sarah is doing a great job modeling existing data, and I will likely head back this coming fall to try to recoup the lost data. Eric and I had a great time leading the Regionals trip to the Cascades. September gave us great weather with only one evening of rain, and plenty of clear, blue sky and views! We had plenty of visitors in the field, including alumni Tia Wood and Maddie Jones. My final exciting event for this year was my winter break trip to New Zealand, with my husband Tom. We haven't traveled for vacation in a while, so it was a treat! New Zealand is fun and easy for travel—we hiked plenty, drank plenty of excellent wine, ate lots of lamb, envisioned volcanoes (it was cloudy quite a bit!), and descended a couple of canyons.

HENRY FRICKE
(Geochemistry)

Hello All! I am writing to you from an Undisclosed Location as I begin a semester-long sabbatical (no, it isn't a barstool, or a chairlift). Paul is taking over as chair during this time. Good luck herding the cats, pal. So here is what I have been up to since the last PCB came out.

I began 2012 teaching a 're-boot' of Geochemistry, only this time with 26 students in the class. The numbers were challenging, as was fieldwork in January, but I think the class went well. Students had the chance to study conditions of laccolith formation, emplacement and uplift along with associated fluid flow using a variety of geochemical techiniques, and this helped illustrate what geochem can bring to the table beyond what you can see with the naked eye. The rest of the spring semester was occupied by a teaching experiment - I taught one class (EV128) over the course of two blocks by alternating days with a professor in philosophy. The idea was to expand upon/experiment with the traditional block plan, and I am not sure you would call the experiment a success. You never know until you try though! In the fall of 2012 I taught GY140 as part of the FYE program, thereby having the chance to meet a great new group of freshmen (and to recruit a few of the best for the major!). I never stop getting a kick out of taking kids on their first CC field trips (although I am not a fan of their generally bad cooking). My last course of the semester was a block of GY210. There were 27 kids in this class, which again was a challenge, but it was great to see so many people excited about geology!

When it comes to research, a colleague and I spent much of 2012 waiting for reviews to come back on a manuscript that discusses the height and extent of the Sevier highlands during the late Cretaceous. It is in press now, so I guess I should formally announce it next year (!). Otherwise I spent much of 2012 in the Paleogene working on several projects/ideas. Work on terrestrial records of hyperthermal events found in Wyoming has been the most successful, and a manuscript is being written as we speak. I continue to be fascinated by the Paleocene-Eocene transition as it is/should be recorded in multiple Laramide basins, and have made this an excuse to drive all over the place/see some wonderful parts of the country. Not a bad gig.

Finally, there isn't much new and exciting to report on the home front, but it has been great nonetheless. It is just so much fun to watch the kids grow up. And although there isn't a whole lot of 'new' going on, we still get our fair share of skiing, rock climbing and general 'outdoors time' in there. Buddy-the-dog is still with us, now completely deaf, but still pestering me for walks a couple times a day. I don't think he misses field seasons at this point (!).

Well I think I have hit all the high points. As usual I hope all is well out there in alumni land, that you'll update us with your notable events, and that you stop by and visit us if you can!

PAUL MYROW
(Sedimentology/Stratigraphy)

Happy New Year to all! It was a busy year as always with plenty of travel and interesting fieldwork. I had two trips to India, both of which included time in Rajasthan, one of my favorite places in all of Asia. The desert region of Rajasthan has beautiful scenery and extraordinary ancient temples. We looked at a wide variety of Precambrian rocks and later revisited a Precambrian–Cambrian boundary section in the foothills of the Himalaya to collect fossils.
In the spring, I revisited my old stomping grounds in Newfoundland and led a three-day field trip as part of a Geological Society of Canada national meeting. It was actually sunny the whole time and it was a lot of fun to see my thesis rocks again with new eyes.
In the summer I visited Inner Mongolia with my student Zach Snyder and a young post-doctoral student from China, Jitao Chen. We looked at great Middle Cambrian and Lower Ordovician sections, one of which was near the top of a mountain directly under an enormous (several hundred feet high), half constructed, bust of Genghis Khan! Jitao is in Colorado for four months this winter and we are working on a study of seismic-generated soft-sediment deformation structures in Cambrian strata in western Colorado.

Later in the summer I traveled to Australia to run detrital zircon geochronology samples at Australia National University. I was able to spend a few days in Sydney on the way and see a bit of the city and the beautiful nearby beaches.

This year I submitted a paper to the journal Palaeo-3 with four CC alumni: Annie Hanson, Anna Phelps, Jessica (J.C.) Creveling (post-doctoral student, Caltech), and Justin Strauss (PhD student, Harvard), along with two geochemist colleagues. This paper documents two regionally extensive Late Devonian unconformities and shows that carbon isotopic anomalies directly below them were produced by diagenetic alteration during subaerial exposure. Also, after a number of revisions, my past thesis student Tim Gibson and I, along with a professor from Harvard and one from University of Arizona, have a paper in press with Geological Society of America Bulletin concerning a Late Devonian tectonic event in Mongolia. I also published a paper in Journal of Sedimentary Research with several colleagues about unusual depositional cycles in Cambrian rocks from Wyoming and Montana.

I was awarded an NSF grant for experimental work at MIT that involves analysis of how small wave ripples are altered by changing wave conditions. The flume experiments yield still photographs and time-lapse movies that illustrate changes in ripple geometry over many hours. These show the mechanisms that accommodate change of ripple wavelengths while transitioning from one equilibrium condition to another. My student Tom Ashley did a fine senior thesis doing quantitative analysis of the images and movies.

I gave a number of lectures this year, including talks at Washington University in St. Louis, Colgate University, and Jodhpur University in India. The latter was a great opportunity to interact with a number of wonderful young Indian students.

On a personal front, I recorded and produced a new CD of my music entitled "Love Takes Me". I recorded the CD in Austin Texas in late spring and summer, and finished production in late fall. If anyone wants a copy you can contact me, or purchase a

copy from the web site CD Baby. The songs are also available for downloading at iTunes, CD Baby, and Amazon, or just to listen to on Rhapsody. Best wishes to everyone and keep in touch!

ERIC LEONARD
(Geomorphology)

Still here – and having a great time (mostly)! Let's see, since last year's PCB I've been teaching, working on various research projects, and graduating one daughter from College and getting ready for the other to graduate from high school. In a moment of weakness I agreed to take over the directorship of the CC Southwest Studies program for the next three years, so I now have one foot in Palmer and one in the Hulbert Center.

Let's start with teaching. Over the last year I've taught Intro Geology, Intro to Global Climate Change, a second-level course on the Rocky Mountains as a Physical System, Glacial Geology, and (along with Megan) the Regional Geology class on the Cascadia Margin. The Cascadia class is described in detail from a student perspective elsewhere in this issue, but from my perspective it was really great to revisit the Olympics, Puget Lowland, Cascade, and Columbia Plateau, to catch up on all of the new work that has been done in the decade or more since I last worked in the Northwest, and to spend time with a great senior class.

Again this year my research work focused primarily on Rocky Mountains glacial geology, with fieldwork in New Mexico, Colorado, and Wyoming and lots of computer modeling. We are into the third year of our NSF-funded project patterns of glaciation and climate change during the last glacial maximum and subsequent deglaciation along the crest of the Rockies. Processing of our cosmogenic radionuclide surface exposure ages through the accelerator lab is going more slowly than we'd hoped, so the great story I promised you last year for this year's Precambrian Basement will have to wait until next year – sigh. We have, however, been presenting our initial results – three presentations at AGU in December with five student co-authors. I've also recently gotten involved in on the Snowmastodon Project with folks from the USGS and the Denver Museum of Nature and Science, again doing glacier and climate modeling, presenting initial results at the project science meeting in Denver in June (during the Waldo Canyon fire!), and working on a manuscript for a special volume of Quaternary Research that will be dedicated to the project. Although I didn't manage any international fieldwork or field trips in 2012, I will be heading to Paris this coming summer to present some of my work (with Beth McMillan and Will Ouimet – remember them?) on landscape evolution of the Front Range at the International Association of Geomorphologists meeting, and then heading off on a field trip to the Pyrenees to look at landscape evolution there.

Besides all of that work, I'm still riding my bike, hiking, cooking weird food, and reading history. Julia has graduated from college (Sarah Lawrence) and after a stint as a summer intern in Washington, DC, followed by a campaign job through the fall, is now looking for work in new media and politics – biding her time in Colorado Springs until she can figure out how to get back to DC. Susan is in her last semester of high school, sweating out the college-application process. Lisa is working too hard – both as a community-

outreach nurse and a clinical instructor a UCCS. I did manage to convince her to take a family trip to Puerto Rico in the spring.

JEFF NOBLET
(Igneous Petrology)

This is my final year as Associate Dean of the Faculty. I have been busy holding on to history and precedent for the new Dean, Sandi Wong, and the new Associate Dean of the College, Re Evitt. To say the office has become busier and somewhat more insane over the last eight years might be an understatement. President Tiefenthaler has most of the campus busily engaged in Strategic Planning this year, new federal policies keep us on our toes, and we still seek ways to create more student opportunities for unique Block Plan educations.

I am already dreaming of a sabbatical year starting July 1st. Plan to spend half of it or so developing new courses (I think there is just one class left on the books that hasn't been changed over the last eight years as the department constantly re-thinks and revises the curriculum). The other half should allow me to finish up the manuscript for a Colorado volcanic project that has been mostly done for some time- and maybe collect a little more data on the magma-mingling rocks before starting to draft a manuscript on what we have learned over the last decade or so of playing with these rocks.

My granddaughter is turning three and for those who recall the young Jenny, Arden is every bit as cute as Jenny was. The wife Jenny, having mastered the skill of distinguishing volcanic from sedimentary rocks at 65 mph (ok- maybe 80 mph) around the Southwest, presented me with an overview of Topology text (her field) that led me into some cool upper-level math. Still not sure we can really talk to each other, but at least married life is interesting.

CHRISTINE SIDDOWAY
(Structure)

Hola, companeros del campo! (The salutation is an indicator for some of my news to you!) Many projects and activities are ongoing (have no fear that I'd abandon something worthwhile!), but here's the essence of what new things I'm up to: (1) taking night classes: Introductory Spanish at Pikes Peak Community College. An experience, to be sure! I'm not sure if it's a true measure, but – I seem not to have lost my touch because I did get an A grade from first semester, even though I found it very tough to keep up with the (online) homework(!!). Am now starting semester 2. (Just imagine all the ways those language skills will come in handy.) (2) Getting liberal artsy – I've had a great time developing and teaching a multidisciplinary CC class called "Rocks and Ruins: Catastrophic Events and Mediterranean Civilization" (it has no field component; rather we make use of Mediterranean GIS…) and this is going to carry forward into a summer seminar for ACM faculty in Italy (yeah!) named "Mediterra-

nean Trivium: Earth, Sea and Culture." The seminar is cotaught with colleagues from History and Classics. (3) This year marks the 125th Anniversary of the Geological Society of America, and it'll be unforgettable to me in a few respects: a) I represent Structural Geology and Tectonics on the Joint Technical Program Committee for the annual meeting in Denver, and at session proposal time in January, we broke the all-time record for number of SGT sessions, and b) Paul Myrow and I will co-lead a GSA trip entitled "Strata, structures and enduring enigmas - A 125th Anniversary Overview of Colorado Springs geology." Any alumni who are feeling nostalgic should come on the two-day trip! There'll be plenty that is new on the excursion, though – we promise. (4) CC's President Tiefenthaler tagged me to work on her strategic planning team this year: I'm co-chairing the Place Committee with Emily Chan of the Psychology Dept. We are conceiving of ways to make even better use of CC's singular location – much good to contemplate. (5) On another worthwhile Committee, Academic Events, we kicked off a new event series at CC called First Mondays. It's the greatest, and it's streamed live from CC to you! Check out the events of the year (podcasts) at and tune in to future events from 11:15 am to 12:15 pm on the first Monday of every block ! Go to: http://www.coloradocollege.edu/other/firstmondays/.

STEAVE WEAVER
(Technical Director)

It has been another busy and exciting year as Geo Tech Director supporting faculty and students in many class and research endeavors. Our new Panalytical Xpert Pro x-ray diffraction unit has been getting great use for classes and student research and this past year we acquired 20 new Trimble Juno GPS units that will be used in a number of classes. They were used first by the GY210 class in October to map an area of the Waldo Canyon Fire burn scar in the Blodgett Peak Open Space. This mapping of affected vegetation, altered landform features, and run-off mitigation features provided a GIS database to use as a baseline for comparison of future changes to the area.

I continue to be active with my photography and once again I was one of the organizers of the Geological Society of America's photography contest. I acted as one of the judges and also printed all of the accepted images that were on display at GSA's annual meeting in Charlotte. For the up coming 125th Anniversary GSA meeting in Denver, I will be co-leading a "geo-photography" fieldtrip/workshop to Roxborough State Park with CC grad Marli Miller, and fellow photographer Ellen Bishop. As always you can check out my work at my website: www.stephen-weaver.com, and follow me on Facebook and Google+.

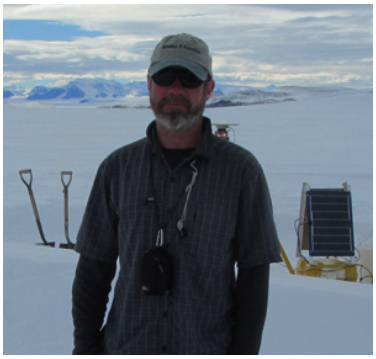
On the personal side I became a grandfather for the 4th time with the birth of Neveah to Carolynn in late May. Sadly I also lost my father to liver cancer in March.

MANDY SULFRIAN
(Staff Assistant)

Happy 2013! It has been an exciting year for us – Charlie and I became grandparents for a total of 3 grandbabies! I love it! Kate, our daughter, delivered Chad in October, and our son, Chris and his wife Shelly, had a baby Grayson in March. Kaylee, Chad's older sister, is loving being a "big sister" and tells everyone she meets!

Charlie & I traveled to Spokane in December for the Northwest Mining Convention and it was great fun catching up with old friends. In February, we went to Kauai, Hawaii with my family and had a wonderful time exploring and relaxing. We took a tour of Kilauea on the Big Island and hiked all over Kauai. What a wonderful place! Now we're already thinking about how we can get back there.

As usual, the year is flying by and I'm constantly amazed by the geology major's energy and enthusiasm. Stop by the basement in Palmer when you're in Colorado Springs.



CHRISTIAN SCHRADER
(Igneous Petrology)

My year visiting here at CC has been great. The block plan allows for plenty of time in the field and that's my favorite way to teach. I've just finished my third section of Physical Geology and I have taught two upper-division courses in my specialties – Volcanology and Igneous Petrology. Working with the rocks in the local section has been great and I enjoy the extended trips as well. I took the Volcanology class to my current research site at Mount Taylor in New Mexico then all the way down to Kilbourne Hole, near the Mexican Border. My Petrology class traveled to Big Bend National Park, a place close to my heart and where I did my dissertation fieldwork. Both classes were new to me and teaching them on the block plan was challenging but rewarding. In block eight I'll be covering Planetary Science, another of my research topics.

In addition to the field trips, I've done a bit of traveling this year. In November I was in Washington D.C. to meet with some planetary science colleagues – I finally saw the back room meteorite collections at the Smithsonian. I attended the meeting of the American Geophysical Union in San Francisco in December, and I presented my work from the Mount Taylor Volcanic Field. And of course I travelled to see family and friends over the holidays.

I'm conducting the Mount Taylor research with three colleagues, and we're

publishing on the volcanology, the state of the mantle below the field, and the magma interaction with the lower crust. My Big Bend work is concerned with crystallization of shallow magmas and the role of water and halogens. In planetary research, I recently submitted a paper on the Martian meteorite EETA79001 and will soon submit a collaborative paper on heterogeneity in the Martian mantle. Looking ahead, I'm planning a new research project on the Raton-Clayton Volcanic field, also in New Mexico.

Work has kept me busy, but I've spent some time enjoying Colorado. I hike most weekends and visit friends in Denver and Fort Collins when I can. It's a great place to live.

Department Publications and NSF Grants

Paul Myrow

Myrow, P.M., Hanson, A., Phelps, A.S., Creveling, J.R., Strauss, J.V., Ripperdan, R., Sandberg, C.A., and Hartenfels, S., in review, Latest Devonian (Famennian) global events in Western Laurentia: Variations in the carbon isotopic record linked to diagenetic alteration below regionally extensive unconformities: Palaeogeography, Palaeoclimatology, and Palaeoecology.

Gibson, T., Myrow, P.M., MacDonald, F., and Minjin, C., in press, Sedimentology, depositional history, and detrital zircon geochronology of the Lower Devonian Tsakhir Formation, Shine Jinst, Mongolia: Geological Society of America Bulletin.

Myrow, P.M., and Narbonne, G., 2012, The dawn of the Paleozoic on the Burin Peninsula: Field Trip Guide book A2, Geological Association of Canada National Meeting Field Trip, 42 p.

Lamb, M.P., Fischer, W., Raub, T.D., Perron, J.T., and Myrow, P.M., 2012, Giant wave ripples in Snowball Earth cap carbonates: Geology, doi:10.1130/G33093.1.

Myrow, P.M., Taylor, J.F., Runkel, A.C., and Ripperdan, 2012, Mixed siliciclastic–carbonate upward-deepening cycles of the Upper Cambrian inner detrital belt of Laurentia: Journal of Sedimentary Research, v. 82, p. 216-231.

National Science Foundation, EAR–Geomorphology, Principal Investigator, $159,070, 3 Year Award: " Collaborative research: Laboratory and numerical experiments on the response of wave ripples to changes in oscillatory flow," 2012–2015

Eric Leonard

Young, N.E., P. Briner, J.P., Leonard, E.M., Licciardi, J.M., Lee. K., 2011, Assessing climatic and non-climatic forcing of Pinedale glaciation and deglaciation in the western US, Geology 39, 171-174.

Leonard, E.M., 2011, Rocky Mountains: in V.P. Singh, P. Singh, U.K. Haritashya (eds.) Encyclopedia of Snow, Ice and Glaciers, 948-952.

Megan Anderson

Dragovich, J. D., Anderson, M. L., Mahan, S. A., MacDonald, J. H. Jr., McCabe, C. P., Cakir, R., Stoker, B. A., Villenueve, N. M., Smith, D. T., Bethel, J. P., 2012, Geologic map of the Lake Joy 7.5-minute quadrangle, Washington: Washington Division of Geology and Earth Resources Map Series 2012-01.

Perarnau, M., Gilbert, H., Alvarado, P., Martino, R., Anderson, M., 2012, Crustal structure of the eastern Sierras Pampeanas of Argentina using high frequency local receiver functions, Tectonophysics, v. 580, p. 208-217.

Porter, R., Gilbert, H., Zandt, G., Beck, S., Warren, L., Calkins, J., Alvarado, P. Anderson, M., in review, Shear-wave velocities in the Pampean flat-slab region from Rayleigh wave tomography: Implications for slab and upper mantle hydration, Journal of Geophysical Research, v. 117, no. B11301, doi:10.1029/2012JB009350.

Ruleman, C. A., Thompson, R. A., Shroba, R. S., Anderson, M. L., Dreneth, B., Rotzien, J.*, and Lyon, J.*, accepted, Late Miocene-Pleistocene evolution of a Rio Grande rift sub-basin, Sunshine Valley-Costilla Plain, San Luis Basin, New Mexico and Colorado: New Perspectives on the Rio Grande rift: From Tectonics to Groundwater, GSA Special Paper.

Department Publications and NSF Grants

Christine Siddoway

Yakymchuk, C., Siddoway, C.S., Fanning, C.M., McFadden, R.R., Brown, M., and Korhonen, F.J., 2013, Anatectic reworking and differentiation of continental crust along the active margin of Gondwana: a zircon Hf–O perspective from West Antarctica, in Harley et al. (eds.), Antarctica and Supercontinent Evolution, Geological Society of London Special Publication.

Carreras, J., Druguet, E., Siddoway, C., 2012, Geological Heritage beyond Natural Spaces: The Red Rocks Amphitheatre (Morrison, Colorado, U.S.A.), an example of syncretism between Between Urban Development andGeoconservation. GeoHeritage Journal (Springer Verlag), DOI10.1007/s12371-012-0062-4.

2013 ACM Seminar in Advanced Interdisciplinary Learning: Mediterranean Trivium: Earth, Sea, and Culture, $107,000. With S. Ashley and S. Thakur, Colorado College.

Paul Myrow and Film Crew

The NHK (Japan Broadcasting Organization) film crew recently interviewed Geology Professor Paul Myrow about the Great Unconformity, a geological feature that is well exposed in the area. The film crew was interested in how the development of the unconformity might relate to the radical burst of evolution of organisms during the Cambrian. Myrow has worked on Cambrian rocks and looked at the unconformity, in outcrops spanning from Montana to Texas for the last 20 years. Courtesy of Colorado College Communications.

That's what I talk about! Professor Paul Myrow looking great as always, happy to be sharing about the Cambrian Explosion of life. Photo courtesy of Colorado College Communications.

Brennan O'Connell (Second from right) geologizing in an undisclosed location in ze Alaskan vilderni.

Artist unknown.

Paleo-Arctic Geochemistry

Brennan O'Connell ('13)

This past summer I participated in a Keck Consortium project in Alaska. We were a group of six students and two professors from universities such as Smith, Pomona, Carleton, Lafayette, and Franklin and Marshall. Our field sites were scattered around the Matanuska Valley in South Central Alaska, between the Talkeetna and Chugatch mountain ranges. We were investigating the paleoecology and paleoclimatology of the Paleocene-early Eocene Chickaloon sedimentary sequence. Our field sites were located at old coal mines with great outcrop exposure. We also did some backcountry exploring to try and find some undiscovered Chickaloon outcrops! We spent a total of three weeks in Alaska splitting time between fieldwork and exploring Alaskan treasures such as Denali National Park, Kenai Fjords National Park, and many places in between. We had a great time working together on our fieldwork, cooking fudge at the campsite, taking our daily swim a number of lakes, and learning a great deal about sedimentary sequences! It was a great way to gain some research experience and travel to the nifty places Alaska has to offer. I had a wonderful experience with the other members of the group and learned a lot about the research process. I am looking forward to some interesting results that will come from our collective research!

A Geologic Freshman Year Experience

Fischer Hazen '16

Looking back at the weeks before college started, I remember the long process of choosing my first block at Colorado College. I spent hours deliberating over what I would find interesting and what might apply best to my future plans, albeit those plans are a bit foggy. In the end, I settled on a FYE class using much the same logic I used to choose CC. I chose to come to CC because of the interactions that I would have with my professors due to small class sizes, as well as the incredible location of CC. I love being outside, exploring and learning about the natural world. Having grown up in Colorado, I find that there is nothing more special or alluring than the amazing landscape and natural beauty of this state. I wanted to take advantage of CC's surrounding geography, and therefore, in anticipation of a few great field trips, I ended up taking the class Rocks, Ruins and Catastrophes: the Physical Geology of Natural Disasters.

I have always been interested in the natural sciences but I had never really had much exposure to geology other than what I learned in my 8th grade science class (Telluride's very small school district had a limited number of electives, and none of them were in the sciences). Not surprisingly, the end of the two-block FYE had those of us in the class saturated with geological information. I loved the material and the class only furthered my conviction that I wanted to work in a field that allowed me to be outside, probably doing some sort of science.

My FYE was exceptional, and for me it was a lot more than just a class. Over the course of two months I came to know my professor, as well as the class TA and FYE advisor pretty well. These relationships were integral in furthering my learning and increasing my excitement about my college career. Everyone I met who was involved in the geology department was very friendly and outgoing. They were all interested in getting to know new students and welcome them into the fun and exciting geology department.

I was very fortunate to have Christine Siddoway as my first professor at CC. She is very exuberant and dedicated to our learning experiences and was always looking for ways to help further our educational experiences. To that extent, Christine offered me a research opportunity over half block working on the thesis project of my FYE Mentor, Dave Freedman.

For a week in January, Dave and I were down in New Mexico doing paleomagnetics research and data collection. It was an incredible opportunity/experience, and although I was only assisting with a small part of the project, it was intellectually invigorating to witness all the research being conducted. The thought had never crossed my mind that I would be able to do research as a freshman, especially after only one semester of college. I do know that these types of opportunities would not have been available to me had I decided to attend a different college. I am very thankful that many in the Geology department, especially my professor and FYE mentor, were constantly attempting to enrich my learning experience and engage me in the wonders of Geology.

FYE field trip to local CC&V Gold Mine on Pikes Peak. CC Alumni Eric Daniels ('09) and Tom Ashley ('12) (Mine Geologist and intern employed at CC&V Mine) are featured on the front of 300,000 ton Euclid Earthmover. Photo by Dirk Rasmussen.

Regional Studies: Cascadia and the Pacific Northwest

Zach Snyder ('13)

For this year's Regional Geology capstone experience, current CC geology majors found themselves whisked off to the Pacific Northwest, a cold, rainy, miserable hellhole. At least that's what one cynic tried to convince me of before we left. With 18 straight days of sunshine, acres of virgin huckleberry bushes, beautiful lakes, forests, beaches, and, of course, rocks, you won't exactly hear me complaining! Taught by Professors Eric Leonard and Megan Anderson, the course investigated a diverse array of topics, from tectonics and volcanism to glaciation and seismic hazard, in order to paint a full picture of the geological processes and phenomena that have shaped, and currently affect, the Washington area.

Instead of having us sit through a succession of dry field lectures, Megan and Eric structured the class with an emphasis on hands-on investigative projects that encouraged us to collaborate and teach each other. In addition to a large group project that was the culmination of our field experience, each student in the class prepared a field presentation for one of the geologic features that we visited on our excursion.

Our first, brief stop was the Bonneville landslide in the Colombia River Gorge, where we gained an appreciation for the awesome power unleashed in mass movements, and the river's incredible pace of erosional compensation. Next, we spent a couple of days around Mt. St. Helens. Visiting Professor—and wise volcanologist—Christian Schrader joined us as we explored volcanic processes and products in the rubbley bowels of Ape Cave Lava tube, at an impressive pyroclastic roadcut, and at the violently log-jammed spirit lake. Next up, we headed north to the tidal flats of Willapa Bay to hear the story of the 'orphan tsunami,' and see first-hand the trees that were sent the way of Davy Jones during that year-1700 earthquake. From there we continued to the west coast of the Olympic Peninsula to examine beachside outcrops of accreted turbidites, and coincidentally found time for a sunset splash in the Pacific surf. We gradually made our way around the Olympics, learning about its glacial history and large-scale structure, as well as the accretionary processes that are responsible for its growth; and with hardly a night spent more than a couple hundred feet from a lake or ocean, campsite entertainment was easy to come-by.

The next leg of our adventure took us into the Puget Lowland area, where ice sheet advance and seismic hazard were prominent themes of our discussion. Joe Dragovich, a collaborator of Megan's, spent a day touring us through quaternary glacial and interglacial sedimentation of the lowland, showing us, among many things, the soft-sediment deformation caused by the shearing force of the over-riding ice body. Taking advantage of our time in the Seattle area, we dropped into the UW geology department to spend some time working on our group projects, after enjoying our one evening off under the city lights. After we had finished in the Puget Sound area, we headed east to explore more complex glacial phenomena in the Cascades and on Mt. Baker. We were joined by glacial geologists Jon Riedel, Scott Linneman, and Doug Clark, local experts on the matter. Meanwhile, back at camp, we all failed to resist the delicious temptation of Baker Lake's sapphire waters. I swear I have never met a group of people that has such a hard time keeping their clothes on.

The final segment of our journey took us out of the wet, and into the bone dry. We wove our way through the Yakima Fold and Thrust Belt and across the Columbia plateau, learning about the mind-bogglingly vast

flood basalts and their crippling deformation, as well as their incision by catastrophic glacial floods. We ended by surveying the sediments deposited in Glacial Lake Missoula in western Montana. Considering that the only near death experience sustained by the group was a severe choking spell by Brennan O'Connell, brought on by a girthy peach pit, I'd say this year's Regionals course was a brilliant success. I think I speak for all of us now-subduction-savvy-seniors when I say, here's to rocks!

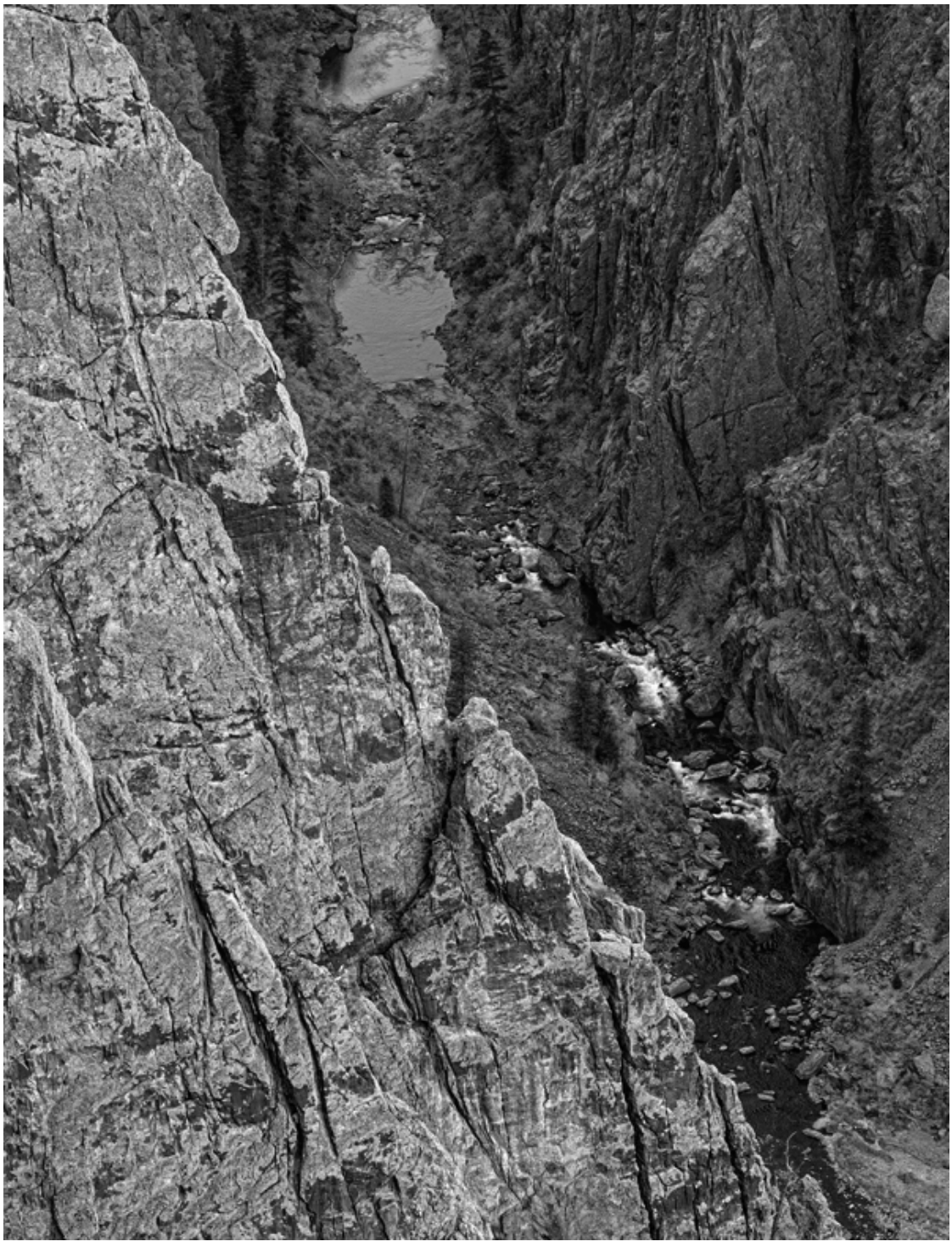


Photo by Stephen G. Weaver

Congratulations

Congratulations to CC folks who are doing great work for the **Snowmastodon Project**! Ian Miller ('99) is one of the co-directors of the project , Saxon Sharpe ('76) and Eric Leonard are project scientists. Adam Freierman ('12) and Sarah 'Gussie' Maccracken ('11, Biology) were summer interns during digging stages of the project. See the December CC Bulletin for more details!

Adam Freierman '12, Gussie Maccracken '11, Ian Miller '99, and Saxon Sharpe '76 were part of the Snowmastodon Project science team reunited for a conference in Colorado this summer. They were photographed at the Denver Museum of Nature & Science with some of the thousands of specimens the team is now studying. Courtesy Denver Museum of Nature & Science.

Ian Miller '99 helped direct the excavation of thousands of plant and animal fossils from the historic discovery near Snowmass, CO. Courtesy Denver Museum of Nature & Science.

THANKS to everyone who attended our 3rd annual CC AGU fall meeting gathering! We had about 30 folks attend and it was great fun—let's do it again next year!

Love Takes Me
New CD: Paul Myrow

I have financed the entire project: recording, musician fees, and production. So please buy the CD!! If you would like a copy of the CD or individual songs here's how:

1. Send a check for $15 per CD and $3 for shipping, along with your address, to Paul Myrow, Dept. of Geology, Colorado College, Colorado Springs, CO 80903, USA; I can also be contacted at pmyrow@gmail.com. Phone: 719-389-6790 or 719-634-8652.

2. Order a CD online from the CD Baby website at: http://cdbaby.com.

3. Download individual songs electronically at iTunes, CD Baby, and Amazon.

If you are willing, please Like Me on Facebook and help me promote the CD. Thank you for supporting my music!

Alumni Spotlight

Zion Klos '09

Howdy there CC geologists!

I've only been away from CC a couple years, and already I am on my way back there in a week to teach another block of fun-filled learning and adventure in the field. It's nice to bring it full circle a little bit. I gained so much from CC geology in my undergraduate experience - from the risks of hiking the Grand Canyon during my first year, to the benefits and thrill that comes from having a senior thesis focused on earthquake hazard and tectonics in New Zealand.

I remember showing up at CC for the first time, fresh off the Greyhound Bus from Wisconsin, visiting as a wide-eyed high-school kid and seeking a short taste of CC. My first night at CC wasn't too much to write home about, staying on the floor of a forced triple in Mathias with a not-so-psyched host who was trying to win over his block crush - a cute girl working in admissions. I was told I could hang out there and play some Nintendo…woo-hoo! Things changed the next day though, I wandered my way over to Palmer and poked my head into the Geology Department, not knowing anyone, I talked to a couple students and said I was a prospective student, asking if there were any professors around I could talk to. They pointed over to Paul Myrow as he popped out of his office. I said hi, and was replied with an instant invitation to join his sed-strat class for a day of field tripping around the local section…and so the

CC Alums, Beth Kochevar ('11), Zion Klos ('09), Lucy Holtsnider ('11), and Lauren Sinnot ('10) reunite in the process of educating the next generation of CC students in a cirque basin on Mt. Bierstadt, Colorado.

Alumni Spotlight (cont.)

Zion Klos '09

"Zion Klos, a doctoral student at the University of Idaho, speaks Wednesday at the Northern Rockies Climate Change Workshop held at the Foothills Learning Center in Boise." – Idaho Statesman, November 2012

adventure began! I hopped in the back of a van with a bunch of cool college kids, all with grungy Carharts on and great personalities to match! Besides being thrown back by learning that this is how class works - field experiences galore - I was blown away by the students and the fun community they had within the department. In the vans everyone was joking and laughing, all eager to ask me questions, as well as answer all of mine about life at CC. After the first outcrop I was starting to catch the CC geo bug, then the deal was set when we stopped for lunch. One of the students - affectionately know by the others as "Danimal" - pulled out a Whisperlite and a pack of Ramen and started up on his lunch cuisine. These were my people, I felt connected already…and still do to this day!

Now, watching the same transformation happen dozens of times over in others since then, I see the contagious nature that the department holds…be it the people, the rocks, the adventures, or all three. It is an amazing learning experience that offers both challenges and support all along the way. For every step the faculty and staff were there as support, particularly my advisor and 'second-mom', Christine Siddoway, who, in exchange for

Alumni Spotlight (cont.)

Zion Klos '09

working my butt off, provided me endless opportunities for learning and adventure at CC and offered constant advice and direction as I started my own track into the world of academic research and teaching.

Spending a year as paraprof was the deciding factor for me…academia, here I come! Paraprofing several intro classes, I saw students open their minds to science and geology in new ways, many thinking at the beginning of their intro course that geo was something that they couldn't do or was beyond their interest (apparently not everyone thinks rocks are exciting at first go). And now, having taught my first intro block at CC as the full instructor, and watching similar high school students and young CC folks make a similar transition as my own, I can see the reward that this type of engaged and experiential teaching offers, both for the student and professor.

Since graduating in 2009, and finishing up as paraprof in 2010, I launched into a new life in Moscow, Idaho at the University of Idaho. I'm now well-along in a PhD in water sciences and interdisciplinary studies. I have a diverse focus centered on hillslope hydrology, near-surface geophysics, subsurface geomorphology, climatology, and communication theory - all under the context of a changing climate and how our natural and social systems may adapt. The journey has been fast, but eventful with field experiences across the West and internationally. Though still focused in the research world, the interdisciplinary aspects offer a chance for significant outreach and interaction with communities and agencies faced with managing their natural resources and landscapes into an unknown future. The PhD experience has also offered a great number of teaching experiences as well, from undergraduate field courses, both here at Idaho and at CC, to challenging graduate courses focused on the nitty-gritty of climate change and how we can start to share this complex information within the challenging political environment Idaho resides.

Thankfully, CC has never been far away since I left. After being here alone only a year, three other CC friends were on their way to Idaho to start their own graduate programs. And not being able to separate too far, we decided to share a house here and keep the party going! Soon we are also going to add one more to our CC contingent - my CC sweetheart, coming back from a few years of utilizing her Fine Arts degree and embarking on a life of exploration on her own, most recently in Japan. After some time apart, we both agree adventures are great, but now we realize that it's more fun not to go them alone!

So, with all that, I find myself about to launch into a crazy block of Hydro at CC. It should be busy, it should be fun, but most of all I think its going to shape up to be a unique intellectual adventure (if I'm allowed to say that still) for the students and myself alike. There is always more to learn, and are always more places to see, but when you can combine your learning and adventures with the awesome group of people that is the CC geo department, that's when you've really found something good!

All the best, and I'm excited to see what adventures lie ahead for all of us!

Geology Spotlight

John H. Lewis

ANTARCTIC BLIZZARD 1969

A local ground blizzard was kicked up by the C-130 transport as it took off on its way back to the haven of McMurdo Station 700 miles to the West. It had just disgorged us with our three months' supplies in Marie Byrd Land on the Antarctic Continent. We were a little forlorn as we recalled the comforts of the large permanent supply base which we had left only hours before. The warm sleeping quarters, excellent meals in the Navy mess hall, and the conviviality of the wardroom after dinner each evening were in stark contrast with our present situation. Alone on a broad gently sloping glacial plain some fifteen miles away from the mountains, we faced our new surroundings. A gentle breeze was dusting our feet with powdery drift, the temperature was about -25 F. We were warm in our well-designed clothing as we did the work of organizing our helter-skelter equipment and packing it all on the four cargo sleds which were to be our moving base of supply for the next three months.

All three of us had read with excitement the accounts of Scott, Shackleton, Amundsen, and others and their experiences in the Antarctic. Now, we were to learn first hand some of the romance and adventure of spending an isolated field season fending for ourselves in a hostile barren mountain range. Even though we had done our reading beforehand, the reality of our being there overwhelmed us a bit those first few moments alone. Each of us wondered if this might not be a bit more than bargained for.

The presence of the large amount of supplies and the diversity of equipment reassured us. No time for feeling lonely. We worked hard packing and lashing our gear onto the four Nansen sleds and then we started north toward the east end of the mountains where we would start our work on two isolated bedrock peaks. The two small one horsepower snowmobiles had hard going. It was gently uphill on rough wind-sculpted glacier surface. Each of the sleds banged heavily along, and much of the time we were running alongside helping pull. Our concern about encountering bridged crevasses was changed to worry about whether or not the heavily loaded sleds would make it. All the way we were impressed with the vastness of the white wastes extending all around us. In the direction of the sun, myriad snow crystals sparkled brightly. Here and there the limitless view was broken by up-surging mountain peaks.

We covered the twelve miles to the peaks in six hours and immediately got to work setting up our first work camp. We camped as close as we could to the bare rock outcrops in order to make the distance short from camp to work. When work was complete in one area, we'd move camp to another location and again have but a short distance to travel to the outcrops where we worked. We picked our first campsite in a wind-swept saddle approximately halfway between the two nunataks which poked up through the ice about a three-quarter mile distance from camp. Our tents had large flaps extending from the outer walls; snow is piled on these to hold them secure. We had difficulty finding a large enough expanse of snow to anchor the tents: the softer surface layers had been blown away, and most of the area was hard bluish ice. We were fortunate to find an elongate narrow drift which we dug into and from this source heaped large piles of snow blocks on the tent flaps. The work was hard – in places the hard-packed snow had to be hacked loose with an ice axe and our inexperience with the tents helped make too long a task of it. These pyramidal tents are named for Robert F. Scott, the heroic Britisher who perished with his companions on his return from the South Pole in 1912. The tents are said to withstand winds of 100 miles an hour.

Moving had taken all day. We were tired and cold. We put together a hot steak dinner in the cook tent and then went to our sleep tent and lay down to rest in preparation for our first day of examining the rocks. We drifted off to sleep to the strange sound of the two-thousand foot thick glacier ice creaking and groaning beneath us, but in our fatigue we managed to sleep deeply. The first four days at this location saw us up by 6:00 to 7:00 AM, and at work in the bitter bright cold by 9:00. All three of us trudged the outcrops collecting samples

Geology Spotlight (Cont.)

John H. Lewis

and trying to get some feel for the complexities of the rocks long ago severely twisted by pressure and heat. By the fourth day we thought we were starting to have some success in making sense of the contorted layers and their relative age relationships, and we thought we were pretty well-seasoned Antarctic workers, fairly confident in our newfound ability to live out there, to eat, to sleep, and to get around safely and comfortably.

The afternoon of this fourth day brought a change. The wind started to pick up and it was painful business to do without a mitten long enough to write in the notebook. Far off in the east we could see a towering murky wall of white which could only be an approaching blizzard. The cloud cover increased; visibility deteriorated; at 4:30 PM we left our work and trudged back toward the shelter of the tents. By the time we reached camp the wind was blowing at about thirty miles per hour; the upper portions of the tents and piles of supplies seemed to be floating ghostlike on the misty whiteness of low-blowing drift. We had spent about as much time as planned at this location and because the walk back to camp had warmed us up we began packing up most of the loose gear around camp. We planned to take a couple more hours sampling the nearby rocks, then we would be on our way to the next campsite some fifteen miles down the glacier to the west. By the time we entered the cook tent most of our stuff was packed and loaded except for clothing for the night and a few odds and ends of food necessary for two meals the next day. We had a light supper and went to bed early eager to finish here and move on.

The night was a restless one. The wind woke us at about 2:00 AM and made the interior of the sleep tent noisy enough to prevent continuous sleep. We dressed, finally, at seven and crawled through the low circular opening which is the door to the tent. Both inner and outer walls have a sleeve of cotton poplin attached to the door so that each can be tied like the top of a gunnysack from either inside or out. Once outside, we couldn't see more than 15 feet, and during the gusts the visibility dropped to near zero. It is most uncomfortable to expose any skin to the blowing drift; the snow and ice crystals melt and refreeze immediately crusting the skin, which feels as if it's being burned at first, then becomes progressively more numb with a deep chill. If left exposed, the yellowish-gray splotches of frostbite blossom very quickly. The temperature was not especially low - about zero Fahrenheit but the wind made it seem much colder. We piled into the dark chilliness of the cook tent -third in line in our camp and fired up the two-burner Coleman stove to melt snow for breakfast tea. With a welcome cup of the warming liquid under our belts, we bundled up again and went outside into the clutch of the wind and got to the radio tent, where most of our personal and field gear was kept.

There's always a ritual to be accomplished as we first occupy a tent for any length of time - the small plastic gasoline containers to be filled from a jerry can, the stove and lantern to be filled from the plastic containers then lit to take the chill out of the tent. While two of us are filling things with gas, the other is tidying up the central area of the 9 x 9 foot tent. After all this is done we are able to shed the great heavy parkas and settle down to whatever occupies us. That morning I spent time sketching the data obtained the day before, labeling rock samples, mending my ripped parka and darning the thumb of a mitten. The conditions outside made it senseless even to think about moving around out there. Then I read a bit. The others were busy with their own tasks. The wind was erratically gusty then; short times of relative quiet followed by noisier periods when the tent walls shook and popped violently. It was our first day of confinement and we speculated about how long the wind might last. Each of us was optimistic about being able to get back to work by tomorrow. The time passed slowly: reading for a while, perhaps a card game, then conversation. We were restless; our attention spans short.

It was three weeks ago today that I left home to come to this desolate place. The continual chilliness, the confinement, our impatience to get going, and a bit of loneliness combine to make me depressed. By 6 PM this day has seemed endless. Three months out here suddenly seems infinite. The decreasing amount of talk and activity in the tent tell me that my companions may share the same thoughts. After a light supper we make an attempt to start the little radio generator and make the regular evening schedule with McMurdo Station. We're supposed to check in every day to send a weather report and let them know that we're all right. We find the generator frozen stiff. Blowing snow penetrated the magneto and flywheel and melted there after we ran it last night. We take it inside the cook tent, put it on a bench and try to thaw it with heat from a lantern.

Geology Spotlight (Cont.)

John H. Lewis

Seeing little melting in an hour, we decide to skip the radio schedule and to wait for good weather tomorrow for freeing it. We go back upwind to the radio tent to have another card game (Schafskopf is the game) then we read a bit or write in the journals, and finally it's time to secure the tent and head for the sleep tent. The wind is somewhat calmer - only 20 mph - so we prepare for sleep with high hopes for a good day tomorrow. The visibility in the blowing drift is still poor. We can just see the hazy outline of the tent twenty feet away.

It's a relief to enter the security of a tent after having been out in the wind, but this relief is somewhat diminished by the prospect of the next ordeal. We have to climb into our frozen sleeping bags after first undressing in the chill of the tent. You are shivering by the time you are stripped down to skivvies, and it almost takes a supreme effort of will to plunge into the double down bag. The skin is immediately numbed and the breath taken away as if you had just jumped into icy water. Soon, however, the body warmth starts to permeate the inner parts of the bag, the intense shivering gradually ceases, and a sublime warming feeling occurs, a feeling not believed possible moments ago. Lying there in new comfort I smile contentedly to myself. The apprehensions about what might be happening outside disappear. It's easy to get to sleep now, lulled by the warmth and, strangely, by the wind's scratching the tent's exterior with the abrasive noise of wind-blown drift. My last thoughts before dozing off are devoted to simple things: wondering about the family at home, and wondering if the weather will permit outside activity tomorrow.

The wind disturbed our sleep at two again (we remember last night) as the velocity and number of gusts suddenly increased producing spurts of deafening noise in the tent. Why didn't I think of plugging my ears with cotton? We remained in our warmth and security alternately chatting and dozing through the rest of the night until it was time, according to our stomachs, to get up for something to eat. We dressed, got out, and burrowed into the kitchen tent. We soon had snow melted for breakfast tea, and as none of us was very hungry, we munched on some frozen Betterwheat biscuits and let the meal go at that. I made an attempt to thaw some biscuits on the stove, but succeeded only in scorching the outside while leaving the inside frozen. I found the best technique was to dunk the biscuit in the scalding tea for just the right amount of time to thaw it, then carefully to transfer this mushy mass to the mouth trying not to have it crumble en route. Most times it wanted to crumble and my new beard became a mess, but in the process I found I had produced a pretty good hot tea base cereal.

The temperature outside was now about plus four degrees - we'd read that the temperature tends to rise during a wind - and the blowing drift, which practically buried the door to the cook tent, kept the visibility down to a few feet. We groped our way back to the radio tent to hole up for a second day, settling down to reading, cards now and then, and a fairly regular schedule of writing impressions in the journal. This new boring yet apprehensive life brought forth many impressions worth preserving. Each of us kept some sort of record of our days. It was a good way to kill time and it seemed strange as I scribbled to remember reading an account in an early journal of just such a storm as this - to compare my woefully misunderstood impressions gained before coming here with the reality which was beginning to clothe my own experience. We had read the tales of others caught in the storms of the Antarctic; suddenly they took on a new and vivid meaning - Cherry-Garrard's near tragic loss of tents during a mid-winter trip from McMurdo Sound to Cape Crozier in 1911 and the storm Gould, Balchen, and June went through when their airplane blew away leaving them marooned in the Rockefeller Mountains in 1929. Yet so far we were in an island of safety and comfort. We could turn on our one burner stove if our feet got too cold, we were dressed warmly, and we could sit and marvel at the design and construction of our Scott tents. What punishment this one had suffered already! I put a note in my journal to go around to the tentmakers in Christchurch, New Zealand, on the way home to praise them for their good work.

Suppertime finally rolled around, and while groping our way to the cook tent we confirmed the continued good shape of the tent exteriors. We cooked up a supper of canned bacon and frozen eggs - the latter cracked out of the can with a chisel and a rock hammer. It was our first satisfying meal in two days. It took about an hour and a half from the time we started up the stove until we were ready to leave the tent for the evening. Eating added to the lethargy built during the past two days and we decided against trying to make the radio schedule. The generator would probably refreeze anyway, and we had already spent about four

Geology Spotlight (Cont.)

John H. Lewis

hours thawing it over two stoves in the cook tent that day. Back to the radio tent again to kill more time before going to sleep. The noise level seemed somewhat reduced. For the first time in three days Chuck Bitgood, our tall quiet geophysicist, searched the dial of his portable short wave receiver and succeeded in getting the time signal from WWV in Fort Collins, Colorado. Here was a distant outside world signal coming from just 90 miles from my home! It made me feel far away.

Today marks the fourth day I've been off cigarettes, and so far it doesn't seem to bother me. It's an ideal way to quit smoking here - no ready source of supply. Chuck has been out of smokes for a couple of days also. He's been going into the C-ration packs occasionally, but so far I don't care to do that. We crawl into the sleep tent and then into the snowy sleeping bags at about eleven, and manage to get to sleep in the still flapping tent. We're somewhat accustomed to the racket of the storm so we get to sleep without much trouble. The worst seems to be over.

Wednesday morning at about four o'clock the big gusts again wake us. We wonder if the wind will ever blow out. The especially heavy gusts give us a start; when they pass, we doze off for a few minutes until the next tent-rattling onslaught. We lie there until about nine when the monotony of being jarred loose from sleep overcomes us. We dress and squeeze through the tent door, finally wiggling up onto the drifted snow outside. We are in the same blowing milky whiteness we left when we went to bed last night. Another day of waiting; more cramped confinement. How long has it been since we were out working? During a cup of tea, the familiar and constant whipping and popping of the tent stops. We stare at each other in amazement at first. Is it the end of the storm, or just a prolonged lull? Our voices are suddenly loud with no roaring background. This is the deadest quiet we've experienced for three days. We're stupefied. The doleful feeling of the past hours is quickly replaced by elation as we scramble outside into a light breeze of about ten miles per hour. We can see the whole camp, the nearly buried cargo sleds, the motor toboggans drifted deeply. We can even see to the half-mile distant outcrops. It seems a year ago we were working on them.

It is strange to be able to stand up. We go to work on the sleds. There are huge accumulations of drift that have to be shoveled off before we can move. Though it is -15°F, we soon change from heavy parkas to light windbreakers. We're giddy as we dig, heave and re-pile our gear. An observer dropped into our midst would have wondered about the sanity of these three maniacs throwing large chunks of snow off their shovels, slipping and sliding, laughing and shouting wildly about what a wonderful day it is. The heavy overcast produces a whiteout so that it is almost as if you were inside a full milk bottle seeing neither horizon nor surface. This contributes to the hilarity of the scene we present: each of us stumbling haltingly along to pitch suddenly forward across some sastrugi into an unseen depression. We have to carry either ice axe or shovel to prod the course ahead - bulky blundering blind men. We work up a weather report and raise McMurdo on the radio. We finish our report with a comment about the fierce winds of the past three days, and the McMurdo operator comes back with, "Do you guys really like it out there?" After signing off, John Wilbanks, our humorist, mutters, "How the hell would he like it out here away from doors you can stand up to walk through and no warm dry bunk waiting every night?"

When we go to bed tired from our six hours work, a light fluffy snow is falling. It is delightful to fall asleep to the accompaniment of a soft sighing of new snow on the tent's walls. At six in the morning it all changes. We are wakened by familiar howling flapping noises. The wind increases tempo to late afternoon, and by the time we're finishing a bowl of soup in the cook tent, we can't hear one another shout. It's as if we've been through four days of preliminaries and now the main bout is beginning. We search each other's faces with apprehension as the giant force of the wind pushes in the upwind side of the tent while the opposite side flaps wildly. What will happen if this frail bit of cloth is carried away? Will we too be blown away with nothing to hold to? A thought from our survival course back at McMurdo: "The wind is your enemy, the snow is your friend." A thought from right now: "How could anyone hope to burrow into the hard packed snow in the face of this brutal wind?" After gathering all the loose stuff in the cook tent in a couple of metal sled boxes, we force our way out the flailing door and make our way to the radio tent to be with most of our still-accessible equipment. It's 8:30 PM now and the noise is deafening. We've rustled around in the 9 x 9 foot space trying to arrange

Geology Spotlight (Cont.)

John H. Lewis

the gear so each has a fairly comfortable area; to have enough leg room, it's necessary to push most of the dunnage back against the walls. When we lean against these piles, we vibrate like jelly with the agonies of the tent walls. As we try to warm up huddled over the single burner stove, the ice crusting our windproof leggings and parkas melts; we become damp in places, then shivering cold. It's bad to get wet - clothing loses its insulating qualities - so we take turns holding various parts of our bodies close over the stove. As fast as we move, something else gets soggy and cold; there just isn't enough heat given off.

I sit and wonder what would happen if we needed assistance. There are no other humans nearer than about 250 miles; they too are most likely trapped in their huts or tents. If we did have serious difficulties, the people at McMurdo, 700 miles away, would have to wait for favorable weather to fly out to help us. We shout thoughts like this more frequently as the wind speed increases and the gusts become more ferocious. The tent labors and squats under the load of the wind. During each gust it seems as if it will come crashing down on us and then rush off in tatters. Maybe this gust is the one to rend a side and expose us to the mad forces which threaten to attack us. It is colder now, and I go about putting on the fleece liners underneath my windproofs. It's awkward trying to wriggle into clothing in the crowded space, and I see myself facing the wind in only my underwear. Shouting into hands cupped over the listener's ear is the only way of being heard. All our cigarettes are gone, and as we sit huddled away from the tent walls, we each have found something to stare at. We glance searchingly at one another as one of the big gusts hits; when it passes a glimmer of a smile here or a shrug of the shoulders there communicates our relief.

A current of excitement courses beneath my apprehensions; perhaps it's a mechanism preparing me for the time when our fragile shelter submits to the limitless wind. This seems as if it may be inevitable, so we get all our warmest clothing on or at least the readily accessible stuff, and then pack up the radio in its case. All other articles are stowed in metal sled boxes or in our gear bags. I come across a forgotten box of cigars and pass it around. The smoke lifts our spirits. While the others read, I write painstakingly in my journal, hampered by the bulky clothing and the cold:

11:30 PM, Thursday. Wind still howling, 70-80 mph. In radio tent, which still holds. Packed up all loose gear a while ago, found cigars, all thoughts of quitting smoking forgotten. Just waiting for the wind to stop. We have been retreating into ourselves. The long confinement has made me drowsy. Quite warm in liners and heavy parka - at least not shivering! I doze off for a moment or two to be shaken awake by another fierce gust. Each lasts a minute or so, they must be over 100 mph. Would be great to be able to crawl into sleeping bag and go to sleep - to forget the wind. Conditions too bad to make trip to sleep tent. Better, too, to stay prepared for being in the open if the tent goes.

12:40 AM Friday. - Have been sitting dozing between gusts. Chill starting to creep through heaviest clothes.

I sit and flex leg and arm muscles trying to warm up without wasting energy. We run the stove for short periods only. The fumes get pretty strong after a few minutes. To open the door is out of the question. I try not to think of the endless white world just past the double cotton walls. A howling cold hell - milky, impenetrable - with unbelievable wind. We keep drifting into progressively colder stupor which results in a few moments with the eyes closed. We're brought to awareness again when the next gust strikes. John recalls this period of the storm thus: "When we had the 'big eye I, sitting in a nine-foot tent with a twelve-foot stare. "

John and I decide to make a trip to check the state of the other tents at about 3:00 AM. We bundle up with mufflers, woolen helmets, and draw the hoods of our parkas tight at neck and face. We untie the ribbons at the tent door and heave ourselves out into the full force of the wind. It sprawls us flat, filling every opening in our clothes with stinging drift. We wiggle and roll toward the sleep tent, seeing nothing and losing all sense of direction. It's impossible to stand up, so we try to maintain a stance on all fours. Each gust unsteadies us or topples us over. We come up against one of the front guy ropes of the sleep tent after having traveled what seems to have been hundreds of feet in God knows what direction. The distance between tents is only twenty feet. We burrow into the snow which fills the door area and struggle to get the ribbons untied. John holds the

Geology Spotlight (Cont.)

John H. Lewis

flap wide and I dive inside. I turn around and help him in, and neither of us can believe that we're in a tent. The noise is as fierce as outside, the visibility just as poor. The back wall's guy rope has given way, the fabric is torn and whipping wildly. All gear within the tent is partially buried - sleeping bags, foam mattresses, and odds and ends of clothing. The tent is filling with snow as we grope for equipment, finally coming up with one of the sleeping bags. John somehow takes it out the door and back to the radio tent. I stay there trying to find the rest of the buried stuff and manage to rescue the other two sleeping bags. The turbulence in the tent is vicious - the loose sidewalls buffet me and, in precarious balance on my knees, it's difficult to hold on to anything. The billowing drift intensifies the gloom in the green tent. The bags are partially filled with snow and bulky as a bundle of soggy pillows as I squirm backwards out the door to return to the radio tent. Back in the wind the best locomotion I can manage is a sort of ramming along – hips high, pushing with the legs, shoulders and arms embracing the sleeping bags. I follow the bags into the radio tent. A welcome release from the force of the wind. We make an attempt to retrieve the rest of the gear from the torn tent, but when we get there again, the back wall has been blown completely against the front. The tent has collapsed while still standing. The stuff remaining inside has been buried or blown away. We return to the haven of the radio tent. Our faces are heavily crusted with ice. It's painful to peel it away from our beards but we have to do this or let it melt slowly and soak our necks and chests with cold water. We've been up and around over twenty hours in this intense part of the storm, but we have one more task before settling in for a longer wait. The white gas supply in the radio tent is nearly exhausted, and it's been some time since we've had anything to eat or drink. We plan the trip to the cook tent more carefully than last time. Whoever goes for supplies should be secured to a rope, the end to be held in the radio tent. Chuck finds a dozen six-foot lengths of heavy rawhide in one of the sled boxes. We knot these together to make a long line. I volunteer to go, tie an end about my waist and, after drawing tight all the ties on my clothes, plunge out into the blizzard. As I start crawling downwind in the direction of the cook tent a gust forcibly rolls me off stance. When I resume crawling, I am tangled in the line. Finally I'm able to clamber up out of the depression between drifts where I tumbled. The wind is punishing. I have difficulty getting to the top of each hummock as I move along. The front of my parka hood is formed into a tunnel, but the turbulence insures that everything is filled with blowing snow including my goggles. I reach into my hood with mittened hand and pull the goggles down to my chin where they catch more snow. I'm disoriented after the tumble, and have only the wind direction to guide me. I can scarcely see my hand close to my face. I guess the cook tent to be situated almost directly downwind of the radio tent - so I keep the wind at my rear and proceed as best I can, feeling my way with my hands, trying to stay up on hands and knees. Each heavy gust flattens me and fills my hood with snow. The wind must be blowing at least 80 mph, and the gusts exceed that by 20 or 30 mph. I feel a tug at my waist - I've come to the end of the rope. No sign of the tent. I must be past it by now. I would have to run in to it to find it. I've missed it or it has been carried away, and I can only head back upwind along the length of the line and have another look. Heading into the wind proves much more difficult than following it - it tends to lift my chest and reduce traction. The worst part is having the blowing snow assail my partly exposed face, which, even though ice-encrusted, feels as if it is being sandblasted. I turn my head as far from the wind as I can and go along with even less sense of equilibrium than before. I travel upwind, for what I judge to be thirty or forty feet, and then tack across to the right, thinking that I should either come to a tent or the cargo sleds. With unreasonable luck, one hand encounters a projection from the snow – the all-but-buried handle of a shovel which was planted near the door of the cook tent. I look up to see a vague greenish blotch ahead - the tent is still there.

Turbulence has scooped out a depression a few feet away from the front of the tent, and a large drift has buried the tent up to the level of the top of the door. I grope around and work at freeing the buried shovel, heave at it, finally tear it loose and attack the drift at the door. The wind attempts to wrench the shovel from my hands as I'm crouched uncomfortably without much stability, but after several minutes of exertion, I've burrowed far enough to find the ties securing the door. They come loose and at last I'm able to slide headfirst down the ramp I've dug into the tent. A deluge of snow accompanies me, and I find that the walls have held. The upwind side has evidently lost its guy rope and now bulges far inward.

Geology Spotlight (Cont.)

John H. Lewis

Food items and cooking gear are scattered everywhere. I stuff my pockets with tea bags, a box of cocoa, spoons, a small aluminum tea pot, a box of biscuits and other goodies. The jerry can is over half full with white gas, so I'll not have to go crosswind to the sleds. After squirming out and up from the tent I turn around with the jerry can caught between my knees to tie the door shut. This means exposing bare hands to the abrasive snow long enough to numb them.

Then the upwind trek to the radio tent. I am anxious to rejoin my companions and to enjoy the security of our "home" and its clutter. The line tied to my waist is buried in places, and I must stop to yank it free before going on, face turned from the wind. Finally the flapping remains of the sleep tent are to my right, and then I'm at the door of the radio tent where a tug on the line opens the door to me and eager hands reach out to help me in. It must be like being dragged up from
the clutches of a raging sea. The jerry can goes in first, then I dive through the door to lie floundering in the center of the tent. As I catch my breath, I fumble in pockets and produce food, cups, teapot, and the other booty I managed to retrieve. Chuck and John wonder what took me so long. They felt the tug on the line when I reached the end about fifteen minutes after leaving them, and it was then forty-five minutes more until I reappeared. I had no idea how long I'd been out. It was incredible that a trip to a tent only fifty feet away could take an hour. There's reason for the fatigue I feel.

They fill the stove and light it, putting snow on to melt for tea while I clear the snow and ice from my outer clothing and face. By the time the water is boiling it's six in the morning and we're sleepy. The cup of tea is refreshing and warming, and we munch on some frozen biscuits to fill the empty places in our stomachs. I produce a mess of chocolate bars and we have a luxurious dessert.

The high noise level and shaking of the tent continue unabated. There is no suggestion that the wind is dying down. It has been battering us this fiercely for twenty-four hours and in our drowsy states we have almost become used to it. The occasional squashing gusts no longer evoke the anxiety of some hours ago. We're slipping into some sort of suspended state in which not much seems to matter. The long confinement and hours of apprehension have combined to wear away my feelings to the point that I care only about being able to sleep uninterruptedly. At odd times now I find myself cursing unreasonably at the uncontrollable forces hemming us in, at other times being stoically patient. We're staring at nothing in particular leaning here on our piles of gear. Random and unconnected thoughts enter and leave my consciousness. I scarcely know whether I'm awake or dreaming - it doesn't really matter which as I nod and then am brought back closer to reality by some sudden change in surrounding noise. After experiencing these extreme conditions for so long, reality is dreamlike.

Time is passing slowly. Smoking a cigar now and then helps break the monotony. I can concentrate for just a few minutes at a time while reading; it's dim and cold in the tent so the book slips out of my grasp enough times to make me lose patience with the effort. So much sitting has slowed the circulation-every movement brings relatively warm skin into contact with cold clothing, so we're constrained to sit as still as possible to preserve an illusion of warmth. I wonder if I'll ever be warm again, or whether I'll ever get out of here. So sluggish are my thoughts, I feel sometimes as if I've always been here - I've known no other existence.

At 3:15 PM - we all look at our watches at the same time - there is a sudden diminution in the noise; we can converse fairly easily. Immediately our spirits rise; we chatter excitedly about the break of the storm and how fine it will be to get outside and back to work again. Within twenty minutes there is practically no wind. The abruptness of the change holds us amazed and almost unable to move. The silence is deafening. We scramble elatedly from the tent into a whiteout but with about twenty miles visibility. Off in the distance, the mountains we'd planned to move to five days before loomed clearly against the dead white surroundings. Nearby, the chaos of our camp. But a few sad tatters remained of the sleep tent; everything else was deeply buried. Numerous dark mounds downwind from the camp proved to be boxes of C-rations and all our jerry cans of gasoline. The sun we hadn't seen for a week was starting to break through the single low layer of clouds. Above the clouds we could see deep blue sky over the mountains to the West.

Geology Spotlight (Cont.)

John H. Lewis

We laughed madly at learning from McMurdo radio that they had had no radio reception for the past couple of days; they apologized for not receiving us. (We would have to wait until later to tell someone about our recent ordeal.)

Then began the task of digging out, enjoying increasing visibility and freedom from the wind. Ahead lay time and space for our work. Beneath our eagerness to get going lay some newfound confidence. We had been baptized.

John H. Lewis
Colorado Springs 1969

Photo by Dirk Rasmussen, East Coast of the Svalbard Archipelagos, 79˚ North.

Geology Day Presentations

April 8, 2011, Olin Lecture Hall
Olin Science Center

Ashley Contreras
"Use of (U-Th)/He thermochronology and GIS to evaluate exhumation history and landscape evolution in Marie Byrd Land, West Antarctica"

David Conwell
"Possible record of environmental change in geochemistry of terrestrial carbonates"

Adam Freierman
"Early Eocene leaf fossils of the Denver Basin, CO: paleoclimatic interpretations and comparisons with other early Eocene floras"

Elle Emery
"Geospatial and Artistic interpretations of Mount Sidley and Mount Murphy, Marie Byrd Land Volcanoes, West Antarctica"

Thomas Ashley
"Experimental Study of the Response of Wave Ripples to Spatial and Temporal Variation in Oscillatory Flow Conditions"

Fransiska Dannemann
"Carbon and nitrogen in headwater catchments: temporal and spatial dynamics of a bimodal precipitation system, Jemez Mountains, New Mexico."

David Freedman
"Geomagnetic Investigation of Clastic Dikes of the Colorado Front Range"

Megan Hurster
"Constraining Spatial Distributions of Anisotropy Using Short Period Seismometers in the Bighorn Mountains, WY"

Dirk Rasmussen
"Possible link between PETM climate change and sedimentological change in the Wind River Basin, Wyoming."

Vivian Spiess
"Paleoglacier reconstruction and estimates of Last Glacial Maximum climate and paleoglacier reconstruction in the Sangre de Cristo Mountains, southern Colorado"

Anne E Hanson
"A Detailed Sedimentological and Chemostratigraphic Study of Upper Devonian Rocks"

Erica Wineland-Thomson
"Petrologic and Geochemical characterization of basaltic, intermediate and rhyolitic magmas in an abandoned Tertiary rift, Northwest Iceland"

Madeline Jones
"A reverse experimental study of pargasitic amphibole in a harzburgite+phlogopite melt at 18kbar and 1350C"

Daniel Rothberg,
"Paleoglacier Reconstruction and Numerical Modeling of Late Pleistocene Climate in northern Mongolia"

Jessica Tréanton, "Lacustrine Record of Climate Change in the Central Peruvian Andes"

Ryan Armstrong, Fransiska Dannemann, Zachary Snyder,
"Examining the feasibility of installing a permanent seismometer within an academic building at Colorado College, Colorado Springs CO"

Senior Awards

Annual Awards
Year: 2011-2012
Rocky Mountain Association of Geologists Award:
Annie Hanson

Estwing Outstanding Senior Geologist:
Tom Ashley
Megan Hurster

William A. Fischer Special Recognition
Eleanor Emery

Rocky Mountain Association of Geologists McKenna Scholarship (for a Junior the previous year – 2010/2011)
Dirk Rasmussen

Buster Scholarships:
Ryan Gall
Annie Hanson
Caleb "Kye" Birchard
Megan Hurster
Dirk Rasmussen

Gould scholarship recipients: Spring 2012
Adam Freierman
Ryan Gall
Vivian Spiess

Putman scholarship recipients: Spring 2012
Zachary Snyder

Hannigan Field Scholarship
Zachary Snyder

Creager Field Scholarship
Annie Hanson
Ryan Gall
William A Fischer Family Scholarship
Abby Seymour

Venture Grants:
David Fay '12 – Travel to Villa La Angostura, Chile, to research "Accessing Post-Volcanic Ecological Recovery of the Patagonian Landscape"

Ryan Gall '13 – Research for "What the Rock Record Missed: Investigating the Role of Soft-Bodied Marine Invertebrates in AncientReefs Through a Modern Analogue in Arrecifes de Cozumel National Park"

Madeline Jones '12 – Reserch for "Arkansas to Austin: A Geologic Exploraiton of America's Best-Kept Secret: Diamonds"

Zach Snyder '13 – Travel to China for research "Constraining the Early Paleozoic Paleogeography of the North China Block Through an Integrated Sedimentological Study of the Cambrian Strata of Inner Mongolia, China"

Ritt Kellogg Grants:
John Collis '13 and David Fay '13 traveled to British Columbia for a grant "Bug'n out in the Bugaboos".

Student Conference Presentations 2011/2012

AGU in San Francisco, CA:

David Freedman '14
"Geomagnetism of Clastic Dikes of the Colorado Front Range, for Determination of Age and Mode of Emplacement"

Alexander Robertson '13
"Delineation of subglacial bedrock structure in glaciated regions using DEMs derived from stereoscopic satellite imagery: An example from the Land Glacier catchment, West Antarctica."

Ryan Armstrong '13
"Repeating Earthquakes in the Darfield Region, New Zealand."

GSA in Albuquerque, NM, Spring 2012:

Dirk Rasmussen '12
"Carbon Isotope Evidence for Preservation of the Paleocene-Eocene Transition in the Wind River Basin, Wyoming and Huerfano Park, Colorado"

David Freedman '14
"Geomagnetism of Clastic Dikes of the Colorado Front Range, for Determination of Age and Emplacement Mechanism"

Seminar Series Spring Semester 2011-12

Block 7 - March 26 -- Dr. Ian Miller ('99), Curator at Denver Museum of Nature and Science, presenting "Digging Snowmastodon: Discovering an Ice Age World in the Colorado Rockies."

Block 8 - April 26 -- Dr. Lindsey Worthington, Postdoctoral Research Associate at Texas A & M, presenting "Glacial Climate and Collisional Tectonics: The Extremes of Mountain-building in southern Alaska"

Block 8 - April 30 -- Dr. Rebecca Flowers,Assistant Professor at University of Colorado Boulder, presenting "Deciphering the rise and fall of continental interiors from apatite (U-Th)/He thermochronometry and implications for mantle dynamics"

Block 8 -- May 4 -- Dr. Scott Burns, Portland State University and 2011-2012 Richard Jahns Distinguished Lecturer in Engineering Geology, presenting "Cataclysms on the Columbia, the Great Missoula Floods"

Dr. Max Berkelhammer, left, returns during block 7 to teach Physical Geology students. Photo by David Conwell.

Seminar Series Fall Semester 2012-13

Block 2 – October 10 – Dr. Max Berkelhammer, CU Boulder, "Temperature changes in southern Rocky Mountain for the last five centuries; the relative roles of natural and anthropogenic forcing"

Block 2 – October 12 – Dr. Tony Barnowsky, UC Berkeley, "Approaching a Tipping Point for Planet Earth"

Block 2 – October 19 – David Williams ('87), Author of Cairns: Messengers in Stone, Stories in Stone: Travels Through Urban Geology, and A Naturalist's Guide To Canyon Country. "Writing the Geologic Life"

Block 3 - November 13 -- Danny Uhlmann, Polar Guide and Professional Photographer "Antarctica! A mountaineer's story of a season in the Fosdick Mountains".

Block 3 - November 13 -- Danny Uhlmann, Polar Guide and Professional Photographer "Skiing Afghanistan: A slideshow of the first ever ski mountaineering expedition to the fabled Wakhon Corridor".

Block 3 - November 16 -- Shannon Mahan, USGS, Denver "Quaternary Geochronology and Luminescence Dating: The Good, The Bad, and the Ugly".

Block 3 - November 20 -- Dr. Eric Erslev, Colorado State University "Linking Rocky Mountain Tectonics, Natural Fracturing and Niobrara Tight Oil Production: Examples from the Bighorns Mountains to Walsenburg, CO".

Block 4 – November 28 -- Dr. Shane Schoepfer, Visiting Prof, CC Geology, "Nutrients, Productivity, and Mass Extinction in an (Ancient) Greenhouse Ocean"

Thanks to all the alumni who have sent updates in this year! We really appreciate it. You can always send us updates at precambrianbsmt@coloradocollege.edu

Alexander Durst '93

I currently work for my family real estate firm in New York City developing high-rise commercial and residential buildings. When developing properties we frequently encounter below contaminated soil and rock. My degree in geology has helped me to manage the remediation process. I am blessed to have studied Geology at Colorado College.

Andrew Nelson '07

After finishing my M.Sc. project on the impact of Fraser river placer mining (look for publications in the Winter 2012 BC studies and June GSAB), I started working as a Fluvial Geomorphologist with Northwest Hydraulic Consultants in Seattle last spring. I have greatly enjoyed the opportunity to do lots of field work in streams and rivers and to continue exploring my home landscape here in the Pacific Northwest. Rachel, my wife, Peregrine, our one-year old, and I live a 10 minute walk from the delta of a small creek into Puget Sound; Peregrine, a geologist in the making, loves nothing better than playing in the creek at the beach.

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http://www.linkedin.com/in/geoandrew

Peregrine, the young geologist!

Ann Clarke '72

I just returned from hiking in Scotland on spectacular parts of the West Highland Way. In Edinburgh there is a statue of James Hutton, where I was reminded of a geology course in the history of geology as a discipline.

Anna Kutkiewicz '11

For about 14 months, I was working in Queensland, Australia as an exploration geologist for an Xstrata owned coal mine, which produces some of the most sought-after coking coal in the world. Most of my

Anna geologizing with the company vehicle. Safety-first with that stylish reflective shirt.

work was field-based, so I spent the majority of my time outside on the drill rig (in 100+ degree F heat!), logging diamond-core and RC chip samples and supervising the rough Aussie drilling crews. The job also involved wireline geophysical interpretation/ data manipulation using modeling software to interpret the data and contribute to the existing geological model, which I found particularly fascinating. I'm currently looking

to get into the minerals mining sector, as the geology is a lot more interesting to me and (typically) more complicated... not to offend the sedimentologists!! With a roster-style work rotation reminiscent of the block plan (working for 14 days, vacation for 7 days), I've had a lot of time to travel all around Australia, and I've definitely fallen in love with this country. I've also managed to avoid getting attacked by any sharks, blue-ringed octopi, box jellyfish, or venomous snakes so far-- after all, I was trained by the mine to be a certified venomous snake handler! Hope all is well in the department!

Baxter Christian '98

My wife Alex and I continue to live in Vancouver BC and are expecting our first child in January. I continue to work in corporate development at Teck Resources which provides constant challenges and constant change; the perfect environment for me. All is well!

Ben Borkan '11

Thus far, I graduated from AmeriCorps NCCC and have moved on to beginning Field Guiding with Open Sky Wilderness Therapy in Durango, Colorado. Thus far, I have enjoyed moving between jobs gaining more life experience and I still wish to pursue geology in the future. I still have many interests in the realm of geology and have spent much time contemplating which one calls to me most.

Claire Renault Blazek '84

At last I am giving the Precambrian Basement an update on what I have been doing since graduating from Colorado College in 1984 (I know it's about time).

After working as a paraprofessional at CC and then as a Geologist at the National Park Service, I received my master's degree in Geology from University of New Mexico (1989). I then moved to New Orleans, Louisiana to work for an environmental consulting firm (W.D. Scott Group) where I developed their geological investigations (soil and groundwater investigations/remediation). After which, in 1993, I changed jobs to work with Materials Management Group (Environmental Consulting) as a project manager/geologist.

In 2005, I became co-founder/owner of Leaaf Environmental, LLC (Leaaf). As a successful business co-owner in New Orleans, I have been responsible developing our company's soil and groundwater investigations as well as remediation projects. As an example of the type of projects I work on, most recently, I completed a Brownfields Project involving the assessment and remediation of a Historic Gas Station whereby we used traditional methods of 'dig and haul' combined with phytoremediation (using poplar trees).

I still treasure my early exposure to Geology from CC. The education and training I received will forever impact my life.

Dan Woodell poses with several exceptional pieces of columnar basalt.

Dan Woodell '09

This past December 2012 I defended my Master's thesis at the University of British Columbia, entitled Constraints on Formation of Columnar Joints in Basaltic Lava. With my newfound M.Sc. degree, I accepted a job at

UBC as a Sessional Lecturer for an advanced structural geology class. While nervous, I'm also excited for this opportunity, and confident that Christine Siddoway has helped prepare me for this! The skiing at Whistler continues to be excellent, and I have no plans to leave anytime soon.

Dave Rodland '96

Greetings from the Phanerozoic! Life goes well upsection ... it's been 16 years (+/- a million) since leaving the basement of Palmer Hall, but CC Geology remains a driving force in my life. I've been teaching geology at Muskingum University for four years now, covering everything from Intro to Paleo and Sed/Strat, and graduated my first group of freshmen this spring. The close relationship between students and faculty we all shared at CC remains a driving inspiration, and I've been thrilled to watch my students present their senior research projects at regional and national GSA meetings, on topics ranging from acid mine drainage to fossil pyritization, brachiopod bioerosion to giant kangaroo biomechanics. On a more personal note, I'm proud to announce my marriage to Amber Spires on Halloween, and we are settling very happily into our life together. I can't wait to bring her back out to Colorado, although she insists on driving Shelf Road and Skyline Drive next time ... something about me being easily distracted by roadcuts? Wishing you all the very best, and my deepest thanks to the faculty who made it all possible!

Debbie '73 and John Dolson '71 are entering their 5th year as Directors of DSP Geosciences and Associates with continued work both domestically and internationally in oil and gas exploration and staff mentoring. We continue to cross paths with CC alumni, but only infrequently as petroleum geologists! We write this note while on assignment in New Delhi, India just after John finished teaching Petroleum Geology at the University of Miami (Florida) as an Adjunct Professor. He continues to write and publish and has new opportunities next year in Indonesia and Vietnam. We've been amazed at what a small world it is in the geological community. There is never a country we visit we don't know someone, either from working in the past as expatriates or through professional organizations like AAPG. Debbie continues to fill time on our overseas travels with friends from prior locations we've frequented or teacher's she's worked with in Cairo, London, Moscow or in the USA. The older he gets, the more appreciative John is of the time he had at CC and CSU to go frequently to the field, learning 'first principles' of geology by actually dealing with the outcrops instead of just reading about it. He continues to encourage young geoscientists to look at the oil and gas industry as a terrific way to start a long and interesting career, both financially and professionally. The pace of change is intense and it is easy to get left behind, but if you are a lifelong learner, there are few better routes to take. In 1971, if you had asked either one of us if 40 years down the road we would look back on a career that took us around the world, let us watch our kids graduate High School at the foot of the Sphinx in Egypt, and gave us time to live and work in London and Moscow, we would only have shaken our heads and laughed. So life is good and this career has been amazing.

John Dolson
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Jon Rotzien '07

What a year for Stanford football, another excellent AGU and field geology! This has been a truly exciting final year of grad school, and I look forward to seeing

fellow CC grads in Houston soon. Following a week-long field trip to Death Valley in January to view the monstrous alluvial fans with friends from King Fahd University of Petroleum and Minerals (KFUPM) and Saudi Aramco, our research group, SPODDS, led an affiliates field trip to the Taranaki and East Coast basins, North Island, New Zealand this February and March. Engineers, sedimentologists, basin modelers and geophysicists came together to learn more about the uniquely fine-grained late Miocene turbidites and seismic-scale mass-transport deposits near the cities of New Plymouth and Gisborne. It wasn't too long before autumn football season arrived and our 20th annual SPODDS review, which was held in Ventura, CA. We had over 50 participants converge on this area north of Los Angeles known for its oil and gas fields since the mid-1800s. We held a day of student talks and then featured an outcrop field trip and core workshop for the Pliocene deposits of the Ventura Basin, including the coarse-grained Repetto and Pico formations that represent a loosely-confined, braid-type setting in an elongate deep-water trough basin. Following a brief morning of herding geologists around outcrops of the Pico Formation (see picture) featuring the famed Ventura Avenue Anticline, we zoomed over to the nearby and historic Shell Clubhouse to view cores of the subsurface Repetto Formation, that closely mimic the sedimentology of the Pico Formation. Amazing that the depositional environments seemingly don't change over a 10,000 ft stratigraphic interval! Aside from the fun of teaching labs in undergraduate courses, it's full speed ahead to a May 3rd defense date. In my free time, I have enjoyed racing for both the university triathlon and cycling teams, and now for Peet's Coffee & Tea, Trigger Point Performance Therapy and GU on the California and Texas cycling circuits.

Linn Brooks '85

Hi to those in the basement! Here is my update for the publication, thanks for the opportunity to reach out to old friends! Linda Roos '85 (after a few marriages and life changes I am now known as Linn Brooks) Hi All! Having meant to only stay in the Vail area for a year, I celebrated my 20th year here last summer. My two kids, Julia and Karina are now amazing, responsible adults and I am greatly enjoying watching them forge out into the world. Five years ago I married my long-awaited soulmate, Gary Brooks, and we are living contentedly in Avon and traveling when work and finances allow, most recently to visit our kids as they study abroad. After 13 years working at the local water district, I was promoted to General Manager last year. This has been a tremendous challenge and tremendously fun, with the occasional opportunity to put the work of water supply into geologic context!

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lbrooks@erwsd.org

Melissa Barton '06

I'm currently working at the National Ecological Observatory Network in Boulder, Colorado, a job which involves sadly few rocks but happily many spreadsheets and dead insects on pins (yeah, I went over to the dark side of modern biology after all). This August I went back to Iceland, this time with my mom, where I finally saw puffins and we visited a lot of fabulous geology, including the mid-Atlantic rift valley of Thingvellir, which was just as awesome the second time.

Dr. Nancy (Nan) Lindsley-Griffin '64 is now Professor Emeritus at the University of Nebraska-Lincoln (Dept. of Earth and Atmospheric Sciences). She and her husband, Dr. John R. Griffin, have moved to Jacksonville, Oregon, to be close to their geological research area in the Klamath Mountains.

Robert Jacobsen '10

I'm currently working at the National Ecological Observatory Network in Boulder, Colorado, a job which involves sadly few rocks but happily many spreadsheets and dead insects on pins (yeah, I went over to the dark side of modern biology after all). This August I went back to Iceland, this time with my mom, where I finally saw puffins and we visited a lot of fabulous geology, including the mid-Atlantic rift valley of Thingvellir, which was just as awesome the second time.

Update: I'm living in Knoxville, TN, working on a PhD in Mars-Earth geomorphology. Knoxville has been a blessing and a home. If you're interested in grad school and would like to ask questions or talk with a CC geo alum, please feel free to contact me. RJacobsen@utk.edu

Peter McCarville '84.

Hard to believe it has been almost 30 years since I got out of CC. I am still amazed that they let me in and and consider myself very fortunate to have had the experience there. I am also so grateful for the two years I spent as a paraprof in the department. Thanks to Eiler, Jeff, Paul, and Eric for that opportunity. Working for the GREAT Eiler Henrickson is a highlight of my life. What a guy. I think of him often and I know that I am one of many.

My wife (also a CC grad) and I are big fans of the place and talk it up every time we get the chance. I have not done any great big things with geology but I rather like to think that it is always with me in some way or another (work and play). I did get to graduate school at the U of New Mexico (class of 1994) and worked with another CC grad (Laura Crossey, 77) as my advisor. And, I did get a GSA Special Publication from my MS thesis of which I am proud. After that it was another unsuccessful attempt to get into the environmental field but I did land a job at Los Alamos National Labs working on the Yucca Mountain project (1995). Lots of base chemistry experiments on absorption of radionuclides in the Tuffs of Yucca Mtn. Being the non-conformist, independent person I am, I soon realized that government work was not a place for me. I really did not have the temperament to climb the ranks of this world. It took me many years but I realized that I was lifestyle oriented, not career oriented.

Instead of more formal geology, I pursued another dream- to own a farm on the western slope of CO and become an organic farmer (1995). Farming, although having previous experience, was like another masters degree at which I spent about 12 years studying and trying to make a living. I applied much of my hydrology (pipe and irrigation), clay mineralogy and geochemistry (soils), and knowledge of the local formations (Mancos shale) from my education. Towards the end of that I started teaching adult ed classes in geology to the local community college. This led to a job as a guide/geologist/naturalist with a company out of Ft Collins that primarily provides programs for Road Scholar (formerly Elderhostel). I lead educational vacations into the great outdoors. I get paid a bit to talk about geology while hiking and skiing. Not bad but not as easy as you may think. The company is Mountains and Plains Institute (MPILLS.org). I continue to lead programs for the company but have been in the business of designing more geology oriented programs that we provide for the Geological Society of America (GSA) and lately I am working with AAPG on programs for them. I still love to farm but have stopped on a commercial level. I built a new house for us a few years back and think I live in paradise.

It is really a shame that the world of geology has become so politicized making conversations about climate change, age of the earth, energy, and other geologic ideas so contentious. Maybe it has always been political and I have had such a sheltered, fun experience with it. One which I would like to

continue.

I reside in Crawford, CO and would love to hear from anyone who remembers me and/or who is interested in joining us on one of our programs. The West Elks, Elks, San Juans, Black Canyon, and access to Utah's Canyon Country are all here and I would be happy to show you my paradise.

Sarah Andrews '73

My geo-accomplishment of late is the publication of my twelfth geology-based mystery novel, ROCK BOTTOM, which is set on a rafting trip on the Colorado River through the Grand Canyon. Currently, I'm up past my eyebrows on final revisions for a memoir of my visit to Antarctica.Hope all goes well with educating the next round of rock hounds.

Steve Spear '69

Still retired, still collecting rocks with a minimum weight of 100kg and putting them in the yard. The Home Owners' Association hasn't stopped me yet.
New website (I hate Facebook) is: www.sgspear.com

Tom Berkman '82

Still actually doing Geology after leaving CC 30 years ago! I've been Denver now for six years working for Anadarko Petroleum, a very large independent with extensive operations in the Rocky Mountains of Colorado, Utah, and Wyoming. Currently, we're focused on the exploring the potential of the Niobrara Fm, but it's a tricky nut to crack in Wyoming. One thing cool about working the Rockies is the opportunity to do field work and study the rocks in outcrop that produce oil and gas in the subsurface. Living in Denver beats the heck out of Houston where I lived for 7 years! Become obsessed with fly fishing in a big way. My family and I go down to the Springs periodically and take in hockey games. Go Tigers!!

Ted Starn '07

I'm from the class of '07. I've been working as an Operations Geologist for ConocoPhillips for about a year now, and enjoying the opportunity to apply geology. I worked for a year in the Texas "oil patch" and now has already moved up to a primo new position with ConocoPhillips in Anchorage, starting in May. I enjoy the ability to test the validity hypotheses of what I develop in consultation with others at work, as we attempt to hold well bores in a target zone through communicating with rig personnel. The challenges involved go far beyond the realm of geology, and I am constantly humbled by tricky data. Best wishes to everyone, look me up if you're in Houston.

Jen Pierce '95

Jen Pierce is an Associate Professor in the Geosciences Dept at Boise State University. She is enjoying life with her 21/2 year old daughter Sabine, 9 month old daughter Annie, husband Dave and dog Camas. When she is not teaching geomorphology, researching wildfires, or changing diapers, Jen is out backcountry skiing in the Tetons, floating the rivers of Idaho, mountain biking around Boise or playing the oboe.

Martha Brummit '09

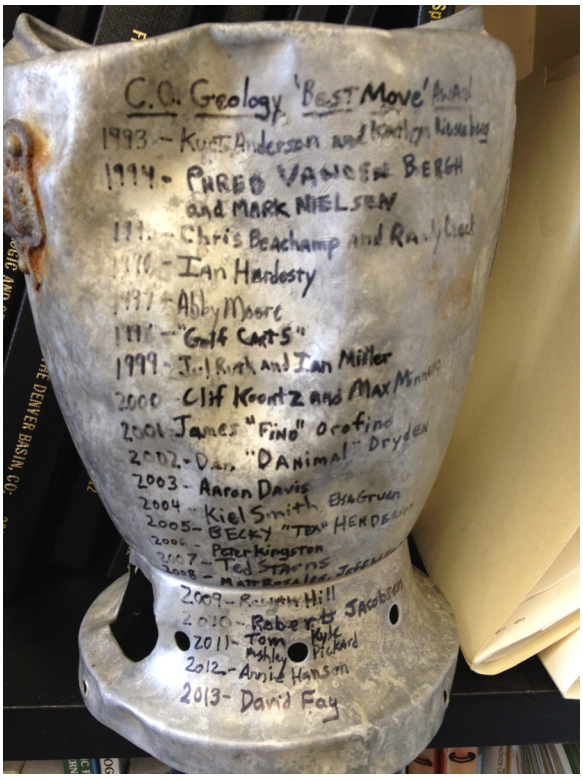
I am in Chile right now, working with the Alzar School (similar to HMI). I am a teaching fellow, helping teach Spanish and environmental science, and going on kayaking and hiking adventures. I am hoping to teach a basic geology lesson to students (in Spanish) alongside a nice roadside outcrop in the next few weeks! Next up, I applied for an Outdoor Education Instructor position at the United World College in SE Asia, to work at the school in Singapore and lead groups of students for 18 weeks of the year on outdoor expeditions in various SE Asia countries. This job is a bit of a stretch for me, but I am going for it!

Karri Sicard '07 completed her MSc at University of Wyoming and has taken a position with the Alaska Department of Geological and Geophysical Surveys (DGGS). She drove the Alaska Highway in February and has begun her new job already!

Maisie Richards '11

Less than a month after graduating from CC I was up in Denali National Park and Preserve backpacking along braided floodplains, up slopes of tundra, around grizzlies and beneath sheared peaks discovering and documenting dinosaur footprints. I also managed to sneak in some scientific illustration through the publication of a kid's brochure on dinosaurs in the park with a reconstruction of what hadrosaurs (plant-eating, duck-billed) and their environment might have looked like. As snow began to encroach in on our hadrosaur and theropod (3-4 toed meat eater) tracks, I spent 3 months warming up in Death Valley National Park (a memorable location for the 2011 geology major regional trip). Here, as a minimally paid intern, I worked with high school kids on a project relating climate change to water in the desert and developed educational materials on paleontology in the park. Up through an off-limits slot canyon are exposures of 6 million year old fine grained sandstone containing cat, horse, camel, and mastodon tracks. Most of the public will never see these beautifully fossilized paw and hoof prints, so another project was drawing estimates of what these paleo-mammals would have looked like to pair with images of the fossils. Temperatures in the valley rose into the 90s and I was back on a plane and train to Denali for my first official NPS job as a physical science technician. The 2012 season was lighter on fossils and heavier on river dynamics, ground slumps and sustainable gravel extraction, but offered plenty of run-ins with grizzlies, overflights of the park, driving large 4-6 wheeled trucks through rivers, and endless ruminations on geomorphology. The next season I will be working for the Forest Service on a project dealing with White Pine mortality and conservation in Rocky Mountain National Park. A bit of a change of pace from rocks, but ties back into my interest in trees that began through a CC thesis on the fossilized tropical trees of Wind River Basin, WY. Hopefully I'll find some way to combine rocks, trees and drawing into one perfect graduate school program!

Maisie Richards geologizing on the job.



CC Geology 'Smooth Move' award celebrating its 20th year!

The 2013 Vancouver Mineral Exploration roundup meetup was a great success! Clockwise from left, we have Dan Woodell, me, Helen Lynn, Nancy Calhoun, Nancy's boyfriend BT, Christian Baxter, Jenny Haywood, and Betsy Friedlander. Ian Hardesty showed up later in the evening. Great event! I might try to organize something for the PDAC in March, and maybe the SEG conference which is happening in Whistler this fall, so I will keep you posted. Kind of curious that half of the group were mentees of Christine!

Cheers,

Matt Rosales

"Just once I wish I could work close to home."

-Edd Enden

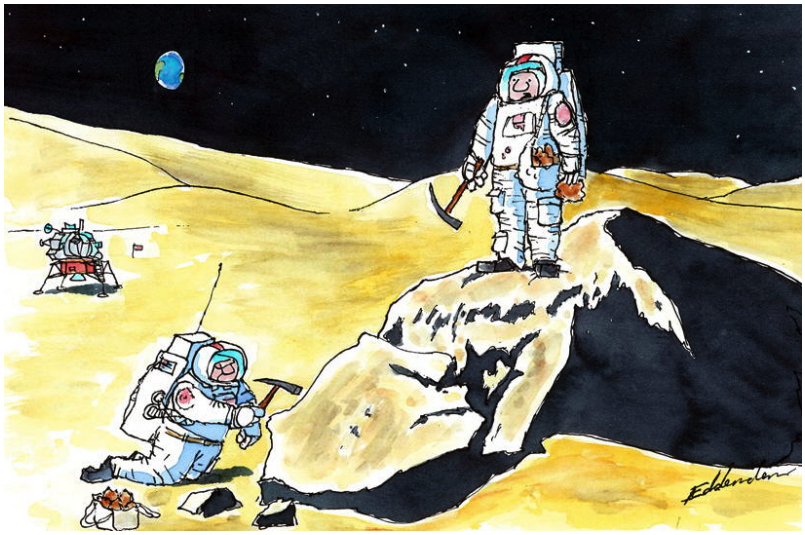


Photo by Stephen G. Weaver

Dear Colorado College Geology Alum:

We hope you have enjoyed the 2012-13 edition of the Precambrian Basement, CC Geology's annual alumni newsletter. We would love to hear what you're up to, where you've been, and where you are now. Please fill out this form and return it to:

The Precambrian Basement
Colorado College
Geology Department
14 E. Cache La Poudre St.
Colorado Springs, CO 80903

OR: email us at *precambrianbsmt@coloradocollege.edu*
We love pictures!

Last Name_____First Name_____

Maiden Name or Nickname_____Year of Graduation_____

Current Address (street)_____

City_____State_____Zipcode_____

Home Phone_____Business Phone_____

Email_____Website_____

Current Employment or Graduate School Info:

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Recent Events, Exciting Adventures, and other Comments

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