MAXIMIZING AN EARLY-CAREER RESEARCHER'S EXPOSURE AT CONFERENCES: POSTER OR ORAL PRESENTATION?

When I first arrived in research-led science, I was skeptical of the benefits of giving a poster. It seemed to me like an escape for those who are afraid of standing up and giving an oral presentation. I was, of course, naïve and overconfident in my relative ability. Over the course of my graduate degree, my opinion has changed. Now I think the two options are of equal importance.

It would be nice if all abstracts were judged solely on their scientific merit, but in reality, I think that many conference conveners believe that researchers with big reputations will deliver a quality talk. In contrast, they probably think that abstracts by researchers establishing themselves in a field have smaller track records and so may be viewed as "risky" for a talk. Talks are traditionally viewed as giving a researcher more exposure. Many early-career researchers are given, or apply for, posters. In theory, a poster should give you the same amount of exposure, or even more, if supervisors and mentors introduce you to the big names and make sure that relevant researchers come to your poster. But this is not much use if you attend a conference with no senior champion from your institution or home country.

How do early-career researchers make their name? How can they make their voice and their science heard in the cacophony of noise that characterizes the average conference venue? Does a presentation or a poster provide a bigger hit?

My Early Experience

My first scientific presentation was at a relatively small conference. My talk was somewhat shaky, and a researcher who thought almost exactly the opposite of me summarily took me down. I'm sure there were other esteemed scientists there who would have easily torn me to shreds had they not shown mercy on my new scientist's soul. But I was still green and giddy with excitement at being involved in scientific research, and I got encouraging words from many a good scientist: a big tick for the oral-presentation format.

After a few small conferences, I finally went to a large international meeting two years ago. I was anticipating a big international audience. Unfortunately, although I realized there would be 16 or so parallel sessions, I had not counted on being scheduled against a superstar keynote lecture in my field. My own talk had an attendance of around eight people. I am sure that we all wished we were seeing Dr. Superstar instead!

In the end, I got a couple of quick questions, along with a few congratulations at the end of the session, and maybe fifteen minutes of discussion with a couple of interested parties. I couldn't help but feel slightly deflated. I had done my job, given my talk, but it wasn't enough. The poster sessions were excellent, and I felt like I had made the wrong choice.

Lessons Learned

Last year, I was determined not to make the same mistake and headed off for a smaller international conference, armed with my very first poster. It was my pride and joy, having spent nearly a month honing the figures and working out what I wanted to show and say.

The poster session was one of the best scientific events I have been to yet. Best of all, it was held outdoors, on a lawn under palm trees, next to the beach (photo). I think the conference had the perfect number of delegates (400 in total) for a poster session. It was small enough that almost everyone read all the poster titles, but large and specialized enough that there were lots of interested people there.

The poster session was one of the most tiring two hours I've ever spent. I had an almost constant stream of people coming and asking questions. Probing and inquiring: What have I done? What do my data show? Did I think about this? Why didn't I do that? Have I considered the possibility of being completely wrong? It is exhausting to have to stand there and defend your poster and your work as academic after academic comes over and tries to pick holes in it all. It felt like being a lawyer in court, standing up and arguing for the defendant (my PhD) in the face of a barrage of questions. But it was fun! Bar a couple of people who seemed to instantly dismiss my research field, most were enthusiastic about what I had done and were certainly keen on seeing the record published. I talked to some great academics, both established and up and coming. It was exhausting, yes, especially being out in the hot sun, but it was quite an experience.

The overall reach of a poster is probably less, but in terms of communicating with those who matter, those who are interested, then a poster is far more penetrating. It certainly beat my experience of giving a talk.

A Dependency on the Conference Itself

My opinion of the quality of poster sessions largely correlates with the adequacy of the air conditioning. I have been to three cramped, hot poster sessions, and have tended to escape very quickly. This is in stark contrast to two light and airy sessions where I feasted on new scientific knowledge.

The reach of an average early-career scientist's presentation has a lot to do with the size of the conference. At a small conference with only a couple of parallel sessions, a talk will almost always have good attendance. At a larger conference, there are so many talks that you can easily get lost in the noise and a poster will stand out more. But is there a point at which there are so many posters that, once again, your tree fades into the woods?

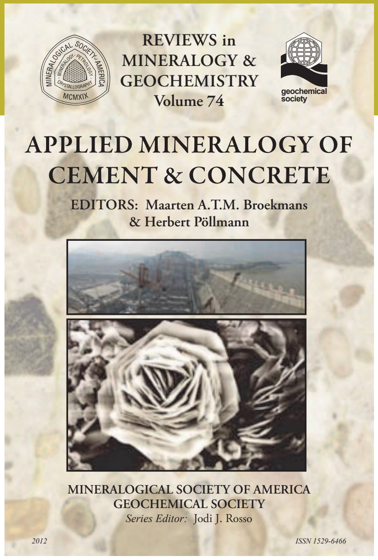
Which leads me to my current situation. By the end of the successful poster session, I had been offered a postdoctoral position… to work with one of the researchers who attended my poorly attended, but successful, talk a year earlier. So, I am pleased that two presentations on my PhD topic were enough to convince a potential employer to offer me a job. Was it the poster, the oral presentation, a combination of the two, or none of these that got me the job offer? I guess I'll never know, but at least now I am happy with both approaches to conference presentations.

GETTING YOUR POINT ACROSS

- *AGU poster guidelines*
  http://fallmeeting.agu.org/2012/scientific-program/poster-session-presenter-guidelines
- *Visual communication*
  http://elementsmagazine.org/processIP.lasso?number=e3_2&filename=dutrow.pdf
- *Making effective presentations*
  www.geosociety.org/graphics/eo/Effective_Presentations.pdf
- *Giving good talks*
  www.geol.wwu.edu/rjmitch/stoning.pdf
- *Designing conference posters*
  http://colinpurrington.com/tips/academic/posterdesign
- *A letter to poster-session organizers*
  http://colinpurrington.com/2012/open-letter-to-poster-session-organizers

Nick Scroxton, Research School of Earth Sciences
Australian National University

APPLIED MINERALOGY OF CEMENT AND CONCRETE[1]



Cements and concretes are among the most widely used materials, and they have had a significant impact on modern human activities and the environment. Ordinary Portland cement is the essential binder in modern concrete, and together with other cement types, it represents a fundamental and cheap commodity for the development of society's infrastructure around the world. Concrete is second only to water in terms of the total volume of raw material consumed annually. It is well known that cement production generates a substantial amount of CO_2, such that the cement industry produces approximately 5% of current, global, man-made CO_2 emissions. It is expected that the increasing global population, the economic growth of developing countries, and a need for climate change mitigation and adaptation measures will boost the future demand for cement. The lack of a real alternative to concrete as a major construction material at a global scale is a challenging issue for the whole planet. Therefore, it is appropriate that the geosciences, and specifically mineralogy and geochemistry, provide a conceptual framework for understanding the problems involved and propose possible solutions. The need for replacing Portland cement–based concrete by alternative formulations with acceptable engineering performance, long-term durability, environmental compatibility, and sustainable production ought to be a fundamental driving force in geoscience research. Given these premises, a volume devoted to the mineralogy of building materials fills an existing gap in the Reviews in Mineralogy & Geochemistry (RiMG) series.

Based on a project conceived in 2006 and approved by MSA Council in 2009, RiMG volume 74 is the product of the short course entitled Applied Mineralogy of Cement and Concrete, which was sponsored by the Mineralogical Society of America and the Geochemical Society and held in Trondheim, Norway, in July 2011, prior to the 10th International Congress for Applied Mineralogy, and again in June 2012, after the International Congress on the Durability of Concrete. The short courses were organized by the editors of RiMG volume 74, Maarten A. T. M. Broekmans, Geological Survey of Norway, Trondheim, Norway, and Herbert Pöllmann, Martin Luther Universität, Halle (Saale), Germany.

Chapter 1, by Herbert Pöllmann, provides an in-depth description of calcium aluminate cements (CAC), including their manufacture, phase diagrams, hydration reactions, and the effects of admixtures and impurities. The wide variety of phase compositions and crystal structures possibly occurring in CACs and their hydration products are listed and depicted. Notwithstanding the fact that CACs are only used in small-scale, specialized applications due to their relatively high cost (H. Justnes, the same volume), the extensive and authoritative review by Pöllmann stands as a state-of-the-art reference for a readership ranging from students to the advanced researcher.

In chapter 2, Harald Justnes presents a critical overview of low-CO_2 calcium oxide sources alternative to calcium carbonate currently used in the production of Portland cement. The pressure to make the production of concrete more sustainable, or "greener," is considerable and increasing. Pure Portland cement will have to be replaced by more complex binary, tertiary, or even quaternary binders, including other types of cementitious materials. This short contribution by the chief scientist at a large independent research organization in Scandinavia has the merit of providing a realistic Earth sciences viewpoint on the sustainability of concrete production.

Paul Stutzman of NIST has long contributed to the development of optical and electron microscopy techniques and standards for studying and quantifying clinker phases in Portland cements. The practical advice in chapter 3 is the result of his long experience in the field. Newer and promising X-ray computed tomography methods aimed at investigating undisturbed sample volumes are briefly mentioned.

Chapter 4, by Roger Meier, Jennifer Anderson, and Sabine Verryn, reflects the great attention given nowadays by manufacturers of analytical equipment, in particular X-ray diffraction instrumentation, to the cement industry. Automated XRD measurements and Rietveld analysis have been successfully applied to the online, continuous monitoring of the cement-production workflow.

In chapter 5, Miguel Aranda, Ángeles de la Torre, and Laura Leòn-Reina provide a complete and authoritative introduction to Rietveld quantitative phase analysis as applied to ordinary Portland cements and their hydration processes. Tables 1 to 3, listing the most common phases occurring in ordinary Portland cements, along with their ICSD and PDF codes, make a very useful and reliable reference for beginners in the Rietveld analysis of cement materials. The chapter is bound to be a reliable and important reference in the future.

The comprehensive and in-depth review of supplementary cementitious materials compiled by Ruben Snellings, Gilles Mertens, and Jan Elsen in chapter 6 complements chapter 2 in convincingly showing that the performance, durability, and sustainability of concrete can be improved by mastering the wide assortment of geological and by-product materials that can be blended with Portland cements. The subject is well covered and thoroughly discussed.

The book closes with chapter 7, by Maarten Broekmans. It treats deleterious reactions of aggregate with alkalis in concrete and deals with several topics possibly related to the main subject. A merit of this chapter is that it shows that the recognition of deleterious processes in concrete requires a combination of techniques.

As pointed out in the volume preface, the applied mineralogy of cements and concrete is a steadily growing field. The selection of a limited number of topics to be covered in a single volume is therefore unavoidable. Unlike a comprehensive textbook, RiMG volume 74 provides a collection of contributions from a competent group of authors. Any reader acquainted with the basics of cements and concrete will find most of the chapters very useful in terms of the depth of coverage and the extensively cited literature. However, in the absence of general guidelines and an appropriate introduction, the beginner might find it difficult to place the chapters in an appropriate context. For example, the notation of cement's chemistry is formally given on page 84 even though it is used earlier. Ordinary Portland cement is properly introduced only in chapter 3, although a discussion of this universally used material could have been given in an introductory chapter. Furthermore, modern methods used in cement and concrete research, such as advanced imaging techniques and computer modeling, are almost completely ignored, apart from a few sparse citations (end of chapter 3); they deserve a more complete coverage.

Applied Mineralogy of Cement and Concrete will be a useful reference for a wide readership in cementing materials. Some of the chapters, especially chapters 1, 5, and 6, will be comprehensive and authoritative sources for those interested in the specific topics. RiMG volume 74 maintains the tradition and standard of the Reviews in Mineralogy & Geochemistry series.

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1 Broekmans MATM, Pöllmann H (eds) Applied Mineralogy of Cement and Concrete. Reviews in Mineralogy & Geochemistry 74, Mineralogical Society of America, i-x + 364 pages, ISBN 978-0-939950-88-1, US$40

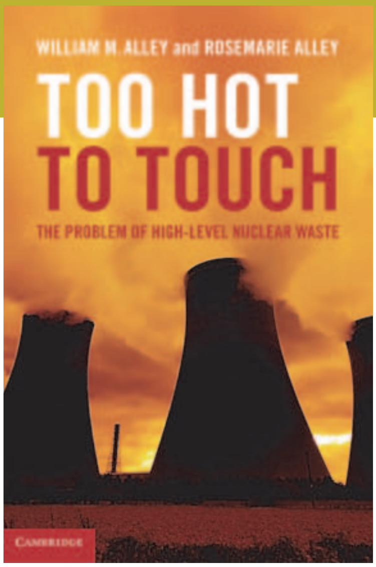
TOO HOT TO TOUCH: THE PROBLEM OF HIGH-LEVEL NUCLEAR WASTE[2]

In 2010, after more than 25 years of study and a $10-billion investment, the Yucca Mountain site in Nevada was shelved by the Obama Administration as a potential repository for high-level nuclear waste. This leaves the United States with no plan for the disposal of its high-level radioactive waste—derived from power plants and weapons manufacturing—currently scattered across 121 sites in 39 states. This story is put into its political, social, and scientific context by William M. Alley and Rosemarie Alley, a husband-and-wife team. William Alley watched the story unfold at close quarters, as he was chief of the Office of Groundwater at the USGS and oversaw the Yucca Mountain project from 2002 to 2010. Rosemarie Alley is a literary specialist who used her talents to make sure the book delivers what it promises: "an engaging and authoritative account of the controversies and possibilities surrounding disposal of nuclear waste in the US." The focus of the book is on the United States, but examples from other countries are woven throughout. In 2012 there were 440 nuclear power plants in 31 countries, and no country had an operating high-level waste disposal facility.

As in so many matters, historical perspectives illuminate the issue at hand. In order to put the Yucca Mountain decision in context, in the first half of the book, Alley and Alley trace the history of nuclear development in the United States, starting with the Manhattan Project, which was mostly carried out at 3 secret locations: the Oak Ridge Reservation, where uranium was enriched, the Hanford Reservation, where plutonium was created, and the Los Alamos National Laboratory, where weapons were manufactured. Electricity from nuclear power was first generated in Idaho in 1951 (this is also where the first meltdown of a nuclear reactor occurred), and construction of the first nuclear plant in the US started in 1954 in Shippingport, Pennsylvania. During the Cold War, the Savannah River site in South Carolina produced plutonium and tritium for nuclear weapons. At the end of the Cold War, 30,000 nuclear warheads were dismantled. The 100 tons of plutonium contained in these weapons are now nuclear waste that has to be dealt with.

Robert Oppenheimer, scientific director of the Manhattan Project and a fervent believer in the peaceful use of the atom, dismissed the waste problem as "unimportant." He was not alone in thinking this way. Most researchers and politicians involved in the early years were confident that the problem of waste disposal would be an easy fix. In 1949, the chair of the Atomic Energy Commission stated that dealing with waste was just a matter of "learning to live with radioactivity." The authors review in several chapters how thinking about dealing with waste has evolved: from dumping it in the ocean to more esoteric solutions, like ice-sheet disposal and disposal in space. There is now a worldwide consensus that a geologic repository is the best way to deal with waste, and Alley and Alley examine the main geological environments that have been considered as potential repositories, including salt beds and domes, which were studied extensively, and the thick unsaturated zone in a desert environment. The Yucca Mountain site belongs to the latter.

The second half of the book is devoted to Yucca Mountain: how Yucca Mountain became the sole candidate for a repository in 1985, the obstacles that were encountered, and the enormous amount of science that was done to characterize the site. In June 2008, in spite of many setbacks, the Department of Energy (DOE) submitted a license application to construct a nuclear waste repository at Yucca Mountain to the Nuclear Regulatory Commission (NRC) for review. The application weighed 50 kg, totaled 8600 pages, and included the results of hundreds of studies. The application was under review by the NRC when the Obama Administration decided to cancel the project.



The terms *NIMS* and *NIMBY* figure prominently throughout the book: "Not in my state" and "Not in my back yard" pretty much summarize the main stumbling blocks. Nobody wants a repository of high-level nuclear waste in his backyard. In the instances where groups or locales were interested, the states used all their legal powers to stop the projects. The authors point out that it is perhaps not accidental that the two countries most advanced in developing a repository—Sweden and Finland—are countries with only a central government and no state or provincial governments. The coup de grâce, however, was the requirement to demonstrate that Yucca Mountain could be safe for 1 million years. The authors look back at the last million years of the geological record to demonstrate how impossible a task this was.

In the wake of shelving the Yucca Mountain site, the Obama Administration created a Blue Ribbon Commission in 2010 to advise on the path forward. Members of the commission submitted their final report in January 2012 (http://energy.gov/ne/downloads/blue-ribbon-commission-americas-nuclear-future-report-secretary-energy).

Alley and Alley stress that even if the world were to stop using nuclear energy tomorrow morning, we would still have to deal with the waste accumulated since 1945. Moreover, nuclear energy is one of the proposed solutions to address global warming. A realistic starting point to move forward is to acknowledge that any course chosen will be an imperfect solution: the problem is too big and too complex. The authors acknowledge that "the technical characteristics of nuclear waste make the disposal problem difficult, but it is the human factors that have made it intractable." Taking the human elements into account is key to avoid past failings.

I encourage anyone remotely interested in the topic to buy a copy. At US$29.95, this is a very affordable book. The authors have done a remarkable job of making the scientific information accessible to lay persons. I certainly learned much about national laboratories, the role of the DOE, the National Academy of Sciences, and the amazing and complex ramifications of politics. Woven in are biographies of scientists and lots of side science stories, from ocean currents to the origin of Monte Carlo simulations. Treatment is fair: you get the sense that the authors tried hard to present the facts and all sides of the story. This book would be ideal for using in a seminar class. Overall a fascinating read!

In the "100 mineralogical questions" exercise, which was summarized in the previous issue of *Elements*, two questions deal with radioactive waste:

- 82. What are the dissolution reactions that lead to the breakdown of nuclear waste materials in deep geological disposal facilities, and what might be the long-term impact of nuclear waste dissolution?
- 83. What is the long-term fate of man-made actinides, mainly plutonium, in the environment?

After reading this book, I would argue that they are the two most urgent and pressing problems to attend to.

Pierrette Tremblay, Managing Editor
Elements magazine

2 Alley WM, Alley R (2013) *Too Hot to Touch: The Problem of High-Level Nuclear Waste.* Cambridge University Press, New York, xiv + 370 pp, ISBN 978-1-107-03011-4, hard cover, US$29.99

EMU SCHOOL 2013: "MINERALS AT THE NANOSCALE"

The EMU School "Minerals at the Nanoscale" was held in the Centro de Instrumentación Científica (CIC) of the University of Granada (Spain) from June 3 to 6, 2013. It was organized by Fernando Nieto and Fernando Gervilla and included both classical lectures and practical sessions. Lecturers explained the structures and microstructures of sulfides, oxides, carbonates, clay and serpentine minerals, metamorphic phyllosilicates, pyriboles, extraterrestrial minerals and biominerals studied under HR-TEM. The lectures were given by Fernando Nieto, Ken Livi, Carlos Rodríguez-Navarro, Encarnación Ruiz-Agudo, Falko Langenhorst, Vidal Barrón, Blanca Bauluz, Krassimir Bozhilov, Patrick Cordier, Cristiano Ferraris, Hugues LeRoux and Mihály Pósfai, who made the school a success because of their high level of academic teaching. The contents of the lectures are compiled in volume 14 of the EMU Notes on Mineralogy series, and participants used this book during the school. It is available now from the Mineralogical Society's online bookshop (www.minersoc.org) and through the online bookshops of the Geological Society (www.geolsoc.org.uk) and the Mineralogical Society of America (www.minsocam.org).

Four practical sessions covered (1) the preparation of samples, including extraction of a sample from a thin section, ion milling, powder sampled on a grid, embedding with resin and cutting with a microtome; (2) the acquisition of diffraction data (SAED) and conventional TEM images, and EDX chemical analysis using a CM-20 apparatus; (3) the orientation of a sample, the acquisition of atomic-resolution images, HAADF, EDX compositional maps and analysis using the new Titan apparatus, recently purchased by the CIC; and (4) the acquisition of EELS spectra and the interpretation of data. These practical sessions were conducted by Isabel Abad, Javier Cifuentes, María del Mar Abad-Ortega and Antonio Sánchez-Navas.

The school was made possible by the participation of postgraduate students and senior researchers from 8 different European countries. The maximum number of participants (40) was reached well before the registration deadline. This limit allowed a maximum of 10 participants in each of the four practical sessions. The school benefited from the financial support of the University of Granada (especially the Department of Mineralogy and Petrology and the Faculty of Sciences), the Spanish Mineralogical Society (SEM), FEI, the Andalusian Institute of Earth Sciences (IACT) and the German Mineralogical Society (DMG). In addition, 15 students attended the school with help from several scientific societies: the Spanish Mineralogical Society, the Commission on Inorganic and Mineral Structures (CIMS) of the International Union of Crystallography (IUCr), the French Society of Mineralogy and Crystallography (SFMC), the Spanish Clay Minerals Society (SEA), the Italian Association for the Study of Clay Minerals (AISA), the Italian Society of Mineralogy and Petrology (SIMP), and the PhD program in Earth sciences at the University of Granada.

The EMU School 2013 ended in the gardens of the Carmen de La Victoria (http://carmendelavictoria.ugr.es/) in front of the Alhambra castle, where participants and teachers enjoyed a cocktail and experienced the magic of a spring evening in Granada.

Fernando Nieto and **Fernando Gervilla**
Department of Mineralogy and Petrology, University of Granada

SFMC STUDENT SPONSORSHIP

Romain Lafay (PhD student at ISTerre, University of Grenoble) and Guillaume Bellino (PhD student at UMET, University of Lille) received grants from the Société Française de Minéralogie et de Cristallographie to help them attend the EMU school "Minerals at the Nanoscale."

Report from Romain Lafay and Guillaume Bellino

The EMU school gave us the opportunity to deal in depth with the possibilities offered by transmission electron microscopy (TEM). During the mornings, well-qualified professors gave us interesting lectures on various subjects and the types of characterization offered by TEM, including technical aspects and traps to avoid. The afternoons were dedicated to practical work, such as sample preparation and the interpretation of data. The various topics covered by the school corresponded well to the needs and expectations of the 40 participants from various countries and backgrounds. It was an opportunity for us to get answers to several questions that have arisen in our own research and, above all, to get a better understanding of this accurate tool. Indeed, we intend to perform measurements with TEM in the near future to accurately characterize our samples.

The school was well organized, and we were warmly welcomed in this beautiful World Heritage–listed city. On top of that, a closing dinner with tapas was held in a typical Spanish house (called Carmen) with a wonderful view of the famous Alhambra de Granada.

The two PhD students sponsored by the SFMC with the EMU school's organizers. From left to right: Romain Lafay (U. Grenoble), Fernando Nieto (U. Granada), Fernando Gervilla (U. Granada) and Guillaume Bellino (U. Lille).

THE SEM AT THE EMU SCHOOL "MINERALS AT THE NANOSCALE"

The Spanish Mineralogical Society (SEM) participated in the EMU school "Minerals at the Nanoscale" (www.ugr.es/~emuschool2013). SEM members Fernando Nieto and Fernando Gervilla organized this interesting school. It covered a wide range of topics related to the application of high-resolution transmission electron microscopy in the investigation of minerals at the nanoscale. The school included practical work using a Philips CM-20 and an FEI Titan at the Centro de Investigación Científica of the University of Granada. The practical work also included preparation of samples and interpretation of data. SEM members Carlos Rodríguez-Navarro, Encarnación Ruiz-Agudo, Blanca Bauluz, Isabel Abad and Antonio Sánchez-Navas gave lectures and practical sessions. Three students were able to attend the school because they received grants from the SEM to cover registration fees and travel and accommodation costs.

THE 6th INTERNATIONAL SYMPOSIUM ON GRANITIC PEGMATITES

PEG 2013
6th International
Symposium
on Granitic Pegmatites

The 6th International Symposium on Granitic Pegmatites was held in New Hampshire and Maine from May 26 to June 2, 2013. The meeting was organized by Skip Simmons, Karen Webber, Al Falster, Bob Whitmore, and others, and was comprised of two parts. The technical part, with talks and poster presentations, was held at the Attitash Grand Summit Hotel in Bartlett, New Hampshire, from May 26 to 30. This involved three days of technical sessions and a one-day mid-meeting field trip to the phosphate-rich Palermo pegmatites of Grafton, New Hampshire. Special exhibits of New England pegmatite minerals were displayed by local collectors, miners, and museums, including Don Dallaire, Gary and Mary Freeman, Gordon Jackson, Jeff Morrison, Bob and Edna Whitmore, the Maine Mineral and Gem Museum, and the Capital Mineral Club of New Hampshire. It was a pleasure to view beautiful local minerals, and the displays were a great source of inspiration for scientific discussion. A total of 105 persons from 19 different countries participated, and most attendees gave presentations. The Attitash Grand Summit Hotel was a wonderful venue for the meeting, and catering by the hotel was outstanding. The first part of the meeting culminated with a banquet and dancing by the Four Winds Native American dance ensemble.

Attendees of the 6th International Symposium on Granitic Pegmatites at the Emmons mine. PHOTO: KAREN LUND MARCHAL

The second part of the meeting consisted of a three-day field trip to gem-bearing, rare-element pegmatites in Oxford and Androscoggin counties, Maine. While in Maine the group stayed at the Poland Spring Resort in Poland. Sites visited during the trip were the Bennett, Emmons, Havey, Mt. Mica, and Waisanen (sometimes referred to as the Tamminen-Waisanen) pegmatites. The trip started with a visit to the new Maine Mineral and Gem Museum in Bethel (www.mainemineralmuseum.org/). Although the museum was still under construction, the group was given a guided tour and allowed to view many of the specimens scheduled for display.

During the field trips, lunches were elegantly prepared by Appetites Catering of Bangor, Maine. Proprietor and Chef Michael O'Neal is also a geologist and pegmatite miner. It was a real treat to be served gourmet meals (e.g. lobster rolls, grilled vegetables, and homemade pies with ice cream) while studying the pegmatites and digging for specimens. We were also provided fresh exposures at many of the mines. Gary and Mary Freeman sandblasted a portion of the underground mine walls at Mt. Mica so that the zoned mineralization could be seen more clearly, and Frank Perham made several fresh blasts at the Waisanen quarry, one while participants were watching from a safe distance. Many interesting discussions arose during the technical sessions and field trips, and most of the symposium participants joined in a semiformal conversation on reevaluating pegmatite nomenclature.

Display of gem elbaite crystals from Newry, Maine. Maine Mineral and Gem Museum, Bethel. PHOTO: KAREN LUND MARCHAL

This symposium is held every two years, and this was the first time it was held in the United States. The next meeting will be convened in Poland in 2015.

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THE 7th INTERNATIONAL SYMPOSIUM ON GRANITIC PEGMATITES

The 7th International Symposium on Granitic Pegmatites will be held in Lower Silesia, southwestern Poland, during the summer of 2015. The technical part of the symposium will take place at Ksiaż Castle, the Pearl of Lower Silesia, which was erected in the 13th century. Pre- and postmeeting field trips will include pegmatites of the Czech Republic and Poland. Closer to the event, more information will be available on the Mineralogical Society of America's Pegmatite Interest Group website, www.minsocam.org/MSA/Special/Pig/PIG_events.html).

The organizing committee for PEG 2015 includes Janusz Janeczek (University of Silesia, Sosnowiec, Poland), Adam Pieczka (University of Science and Technology, Kraków, Poland), Milan Novak (Masaryk University, Brno, Czech Republic), William "Skip" Simmons (University of New Orleans, USA), Eligiusz "Elek" Szełęg (University of Silesia, Sosnowiec, Poland), and Adam Szuszkiewicz (University of Wrocław, Poland).

2013

August 25–30 Goldschmidt 2013, Florence, Italy. Website: www.goldschmidt2013.org

August 26–30 Meteoroids 2013, Poznan, Poland. Web page: www.astro.amu.edu.pl/Meteoroids2013/index.php

September 2–4 Metamorphic Studies Group: Building Strong Continents, University of Portsmouth, UK. Details: craigstorey@port.ac.uk; web page: www.port.ac.uk/special/buildingstrongcontinents

September 2–10 10th International Eclogite Conference, Courmayeur, Aosta Valley, Italy. Web page: www.iec2013.unito.it

September 4–8 Crystallography beyond Diffraction, Camerino, Italy. E-mail: info@aicschool.org; web page: 2013.aicschool.org.

September 8–12 246th American Chemical Society National Meeting & Exposition, Indianapolis, IN, USA. Web page: www.acs.org

September 8–13 14th International Conference on the Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere, Brighton, UK. Web page: www.iagc-society.org/resources/Migration%202013%20second%20announcement.pdf

September 9–11 Japanese Association of Mineralogical Sciences Annual Meeting, University of Tsukuba, Japan. Web page: jams.la.coocan.jp/e_meeting.html

September 9–13 Topological Methods in Crystal Chemistry and Materials Science, Lausanne, Switzerland. Web page: www.crystallography.fr/mathcryst/lausanne2013.php

September 11–15 2nd International Conference on Clays, Clay Minerals, and Layered Materials (CMLM2013), St Petersburg, Russia. Website: www.ruclay.com

September 16–19 Geofluids: Lubricants of the Dynamic Earth, Joint Annual Meeting DMG and GV/Sediment, Tübingen. Web page: www.dmg-gv2013.de

September 22–27 Applied Isotope Geochemistry 10 (AIG-10), Budapest, Hungary. Web page: www.aig10.com

September 24–27 Whistler 2013: Geoscience for Discovery, Whistler, BC, Canada. Website: www.seg2013.org

September 30–October 5 International School on Fundamental Crystallography, Guletchitza, Bulgaria. Web page: www.bgcryst.com/index.php?option=com_content&id=62

October 2013 CMM Autumn School: Moisture Measurement in Porous Mineral Materials, Karlsruhe Institute of Technology (KIT), Germany. Web page: www.cmm.kit.edu/english/index.php

October 6–10 50th Clay Minerals Society Meeting, Urbana-Champaign, IL, USA. Website: www.clays.org/annual%20meeting/50th_annual_meeting_website

October 11–13 New England Intercollegiate Geological Conference (NEIGC), Millinocket, ME, USA. Web page: http://neigc.org

October 17–20 XX Anniversary Meeting of the Petrology Group of the Mineralogical Society of Poland "From the Deep Earth to the Human Environment", Niemcza, Lower Silesia, Poland. Web page: www.ptminxx.ing.uni.wroc.pl

October 21–24 AGU Chapman Conference: Soil-mediated Drivers of Coupled Biogeochemical and Hydrological Processes across Scales, Tucson, AZ, USA. Web page: chapman.agu.org/soilmediated

October 21–30 Short Course: Introduction to Secondary Ion Mass Spectrometry in the Earth and Environmental Sciences, Helmholtz Institutes in Dresden, Leipzig, Potsdam. Web page: www.gfz-potsdam.de/SIMS

October 26 Short Course: Using Laser Ablation Split Stream (LASS) Geochronology and Petrochronology to Address Tectonic and Petrologic Questions, Denver, CO ,USA. Web page: http://community.geosociety.org/2013AnnualMeeting/Conference/Courses/#sites.google.com/site/icpgeolucsb/la-icpms-shortcourses/short-course-gsa-2013

October 26 Short Course: An Introduction to the Theory and Methods of (U-Th)/He Thermochronology, University of Colorado, Boulder, CO, USA. Web page: www.colorado.edu/GeolSci/thermochronology/CU_Thermochronology/Lab_News/Entries/2013/6/10_Introduction_to_%28U-Th%29_He_Thermochronology_at_GSA_2013.html

October 27–30 Geological Society of America Annual Meeting, Denver, CO, USA. E-mail: meetings@geosociety.org; web page: www.geosociety.org/meetings/2013

October 27–31 MS&T'13: Materials Science & Technology Conference and Exhibition, Montréal, QC, Canada. Web page: www.matscitech.org/about/future-meetings

October 29–November 1 First Latin American Crystallographic Meeting, Córdoba, Argentina. Web page: www.cristalografia2013.com.ar

November 4–7 7th International Workshop on Chemical Bioavailability, Keyworth, Nottingham, UK. E-mail: cbio7@bgs.ac.uk; web page: www.bgs.ac.uk/news/events/bioavailabilityWorkshop

November 18–21 26th International Applied Geochemistry Symposium 2013, Incorporating the New Zealand Geothermal Workshop, Rotorua, New Zealand. Web page: www.gns.cri.nz/iags

December 1–6 MRS Fall Meeting & Exhibit, Boston, MA, USA. Web page: www.mrs.org/fall2013

December 9–13 AGU Fall Meeting, San Francisco, CA, USA. Web page: http://sites.agu.org/meetings

2014

January 26–31 38th International Conference and Expo on Advanced Ceramics and Composites, Daytona Beach, FL, USA. Details forthcoming. Web page: ceramics.org/meetings/38th-international-conference-and-expo-on-advanced-ceramics-and-composites

February 2–6 94th Annual Meeting of the American Meteorological Society. Web page: http://annual.ametsoc.org/2014/index.cfm

March 16–20 247th ACS National Meeting & Exposition, Dallas, TX, USA. Web page: www.acs.org

March 19–21 North Atlantic Craton Conference 2014, University of St Andrews, Fife, Scotland, UK. Web page: www.nac-conference2014.org.uk

April 6–9 AAPG 2014 Annual Convention & Exhibition, Houston, TX, USA. Web page: www.aapg.org/meetings

April 21–25 MRS Spring Meeting, San Francisco, CA, USA. Web page: www.mrs.org/spring2014

April 27–May 9 International School on Fundamental Crystallography: Fourth MaThCryst school in Latin America, La Plata, Argentina. Webpage: www.crystallography.fr/mathcryst/laplata2014.php

May 21–23 Geological Association of Canada /Mineralogical Association of Canada Annual Meeting, Fredericton, Canada. Web page: www.unb.ca/conferences/gacmac2014

May 24–28 American Crystallographic Association Meeting, Albuquerque, NM, USA. Details forthcoming

June 8–13 ZEOLITE 2014, Belgrade, Serbia. Web page www.inza.unina.it/upcoming-events/111-zeolite-2014-full

June 9–13 Goldschmidt Conference, Sacramento, CA, USA. http://goldschmidt.info/2014

June 30–July 4 Asteroids, Comets, Meteors, Helsinki, Finland. E-mail: acm-2014@helsinki.fi; web page: www.helsinki.fi/acm2014

July 13–17 BIOGEOMON 2014 – 8th International Symposium on Ecosystem Behavior, Bayreuth, Germany. Web page: www.bayceer.uni-bayreuth.de/biogeomon2014

August 3–7 Microscopy & Microanalysis 2014, Hartford, CT, USA. Web page: www.microprobe.org/events/microscopy-microanalysis-2014

August 5–12 23rd Congress and General Assembly of the International Union of Crystallography, Montréal, Canada. Website: www.iucr2014.org

August 10–14 248th ACS National Meeting & Exposition, San Francisco, CA, USA. Web page: www.acs.org

August 25–September 3 EMU School 2014: Planetary Mineralogy, Glasgow, Scotland. Web page: http://eurominunion.org

September 1–5 21st General Meeting of the International Mineralogical Association (IMA2014), Johannesburg, South Africa. E-mail: info@ima2014.co.za; web page: www.ima2014.co.za

September 7–14 Annual Meeting of the Meteoritical Society, Casablanca, Morocco. Web page: www.meteoritical-society.org

September 10–12 Planet Formation & Evolution 2014, Kiel, Germany. Web page: www1.astrophysik.uni-kiel.de/~kiel2014/main

September 21–24 The 92nd Annual Meeting of the German Mineralogical Society (DMG), Jena, Germany. E-mail: Falko.Langenhorst@uni-jena.de

October 12–16 MS&T'14: Materials Science & Technology Conference and Exhibition, Pittsburgh, PA, USA. Web page: www.matscitech.org/about/future-meetings

October 19–22 Geological Society of America Annual Meeting, Vancouver, BC, Canada. E-mail: meetings@geosociety.org; web page: www.geosociety.org/meetings

November 24–28 Matériaux 2014, Montpellier, France. Web page: www.sfmc-fr.org/spip.php?article151

November 30–December 5 MRS Fall Meeting & Exhibit, Boston, MA, USA. Web page: www.mrs.org/fall2014

December 15–19 AGU Fall Meeting, San Francisco, CA, USA. Web page: http.sites.agu.org/meetings

2015

January 25–30 39th International Conference and Expo on Advanced Ceramics and Composites, Daytona Beach, FL, USA. Details forthcoming

March 22–26 249th ACS National Meeting & Exposition, Denver, CO, USA. Web page: www.acs.org

May 31–June 3 AAPG 2015 Annual Convention & Exhibition, Denver CO, USA. Web page: www.aapg.org/meetings

July 27–31 Annual Meeting of the Meteoritical Society, Berkeley, CA, USA. Web page: www.meteoriticalsociety.org

August 2–6 Microscopy & Microanalysis 2015, Portland, OR, USA. Web page: www.microprobe.org/events/microscopy-microanalysis-2015

August 8–14 Geoanalysis Conference, Leoben, Austria. Web page : www.geoanalysis.info

August 16–20 250th ACS National Meeting & Exposition, Boston, MA, USA. Web page: www.acs.org

August 16–21 2015 Goldschmidt Conference, Prague, Czech Republic. Web page: www.geochemsoc.org/programs/goldschmidtconference

August 24–27 SGA 13th Biennial Meeting, Nancy, France. E-mail: sga-2015@univ-lorraine.fr

September 9–11 8th European Conference on Mineralogy and Spectroscopy (ECMS 2015), Rome, Italy. Details forthcoming

October 4–8 MS&T'15: Materials Science & Technology Conference and Exhibition, combined with ACerS 117th Annual Meeting, Columbus, OH, USA. Details forthcoming

November 1–5 Geological Society of America Annual Meeting, Baltimore, MD, USA. E-mail: meetings@geosociety.org; web page: www.geosociety.org/meetings

The meetings convened by the societies participating in *Elements* are highlighted in yellow. This meetings calendar was compiled by Andrea Koziol (more meetings are listed on the calendar she maintains at http://homepages.udayton.edu/~akoziol1/meetings.html). To get meeting information listed, please contact her at Andrea.Koziol@notes.udayton.edu.

ARSENIC – THE GREAT POISONER REVISITED

D. J. Vaughan* and D. A. Polya*

In 2006, *Elements* magazine published an issue on the subject of arsenic, an issue to which we both contributed (Vaughan 2006; Charlet and Polya 2006). Topics covered in this now widely cited publication included the mineralogy, chemistry and geomicrobiology of arsenic, along with the environmental and human health impacts of arsenic contamination of soils and waters from both anthropogenic and natural sources. A particular concern highlighted in these papers was the arsenic contamination of drinking water over large parts of southern Asia, a contamination that has led to the premature deaths of many thousands, possibly millions, of people and to a situation that the leading epidemiologist A. H. Smith has described as "the largest poisoning of a population in history".

Since 2006, over 3000 articles concerned with this arsenic poisoning have been published in the scientific literature, and numerous others in the popular press. The present article is the first in what is hoped will be a series in *Elements* under the title 'Mineralogy Matters'. The series will address the question as to whether research in mineralogy (broadly defined to include petrology and geochemistry) has made an impact, in this case on a pressing human health problem. Has, in fact, mineralogy 'mattered' in this case?

In recent decades we have learnt a lot about the geochemistry of arsenic; for example, in understanding the speciation of arsenic in sulfide- or carbonate-containing solutions (Helz et al. 1995; Neuberger and Helz 2005; Helz and Tossell 2008), or the interaction of arsenic in solution with mineral surfaces (Farquhar et al. 2002), and its incorporation into minerals such as iron oxyhydroxides and oxyhydroxysulfates (Cutting et al. 2012). In such studies, advanced analytical, imaging, spectroscopic and computer modelling methods have been used to considerable effect. They have been applied both to 'model' laboratory systems and to 'real world' systems such as arsenic-contaminated industrial site (Cancès et al. 2008), where the speciation of As in soils is critical for determining the bioavailability of the toxin and, hence, for a proper risk assessment.

Regarding the great contemporary problem of arsenic contamination of drinking (and irrigation) water in countries including India, Bangladesh and Vietnam, recent overviews emphasise that the original source of the arsenic is almost certainly largely rocks containing sulfide minerals in the rapidly eroding Himalayas (Polya and Charlet 2009; Fendorf et al. 2010). The breakdown products of these primary minerals include iron (oxyhydr) oxides, which can transport arsenic incorporated in their structures or sorbed to their surfaces. Following transport in this form via great rivers such as the Ganges, this material is deposited on their floodplains and contributes to the sediments hosting the aquifers that are now accessed by shallow wells from which the drinking water used by many millions of people is extracted. Release of the arsenic into the drinking water is envisaged as being particularly associated with microbial reduction of solid phase Fe(III) and of As(V) to the sometimes more labile As(III) (Islam et al. 2004). In all these processes, mineralogy plays a key role, including the possibility of controlling the distribution of As(III) versus As(V) between different biomineral species (Coker et al. 2006). As microbial reduction of Fe(III) and As(V) both require the presence of an electron donor, notably labile organic carbon, the organic geochemistry is also an important part of the story (Rowland et al. 2007; Neumann et al. 2010).

Collecting well water in West Bengal

The studies mentioned above help in understanding the origins of the problem, and also inform the approaches that might be taken to remediation, both in situ and ex situ. The geology and hydrology are important here, as well as mineralogy. One approach has involved extracting water from deeper, uncontaminated aquifers, although a major concern here is the potential contamination of these aquifers by the shallower groundwaters as a consequence of extraction (Burgess et al. 2010; Winkel et al. 2011). This, and the possibility of exhausting the deeper sources, has led to calls for the use of deeper waters only for drinking rather than for less critical uses such as irrigation (Fendorf et al. 2010). The mineralogical and geochemical aspects of remediation strategies centre on both in situ and ex situ approaches. For example, it may be possible to manipulate the carbon loading in an aquifer so as to control microbial activity, or modify both chemistry and microbial activity so as to immobilise the arsenic as a highly insoluble phase, such as a sulfide (Héry et al. 2010; Omoregie et al. 2013). Such in situ approaches are still highly speculative and require rigorous testing before any widespread use, given the dangers of creating new problems. The ex situ remediation of water at the well head or at the point-of-use, for example in households, is much more established and has a distinctly mineralogical aspect. The iron oxyhydroxides produced by the aqueous oxidation of metallic iron filings, including nano-scale zero-valent iron (NZI) particles (Kanel et al. 2005), can be used to take up arsenic from the water prior to domestic use. The decrease in the efficiency of such systems as a result of clogging with Fe-bearing precipitates and other factors, however, remains a significant practical concern (Hossain et al. 2005). Also, many chemical remediation technologies involve an oxidation step, taking advantage of the often stronger sorption of As(V) as compared to As(III), although this has now been shown not always to be the case (Dixit and Hering 2003).

When we consider more generally the poisonous nature of arsenic, it is worth noting that its toxicity and bioavailability are strongly linked to its chemical speciation. For example, it is the trioxide that has been the form commonly used by murderers and assassins since ancient times, whereas compounds such as the arsenosugars are widely thought to be essentially non-toxic. Three historical examples of accidental poisonings of communities are illustrative of three major Goldschmidt-style types of geochemical behaviour that arsenic follows. In the first case, in an incident in the 1950s, many children in western Japan were poisoned through drinking milk from a commercial supplier. Here, arsenic in the form of arsenate substituting for phosphate entered the food chain when non-pharmaceutical-grade phosphate was used to stabilise the powdered milk product (Yorifuji et al. 2011). A second example illustrates why rice is particularly susceptible to arsenic contamination when irrigated with arsenic-bearing groundwaters and grown in paddy fields under reducing conditions. Under such conditions in near neutral waters, the predominant aqueous arsenic species is H_3AsO_3, which is of a charge (zero) and size very similar to that of H_4SiO_4 and, accordingly, follows an influx pathway for H_4SiO_4 through aquaporins (proteins forming cell

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membrane pores that control the water content of cells) into the rice plant (Ma et al. 2008). The third example has arsenic in a more familiar geochemical role – as a chalcophile element. In 1900, several thousand people in Manchester, England, were struck down by poisoned beer. The poison was arsenic introduced through the use of impure sulfuric acid in the brewing process; the sulfuric acid was contaminated by the As-bearing pyrite employed to make it. This is a story where mineralogy very clearly did matter.

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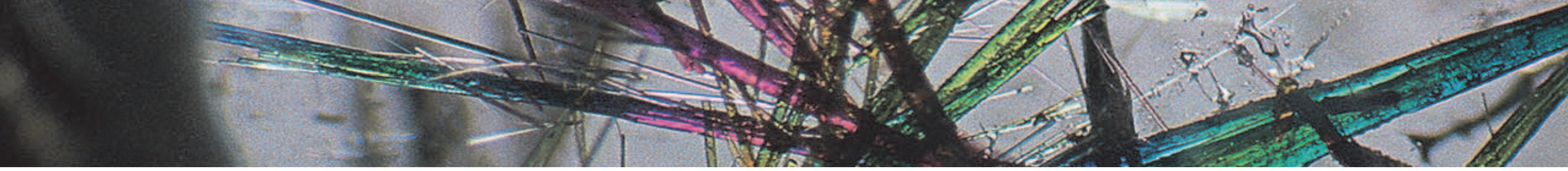

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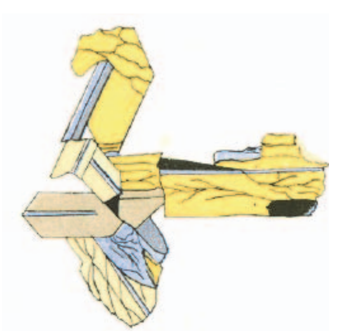
TROUBLE WITH TELECOMMS

My little Parting Shots articles start their journey to your desk (or, I hope, your sofa) from my house in the West Highlands of Scotland. At the click of a mouse, they start their journey down a copper cable sheathed in grey plastic. For the first 200 m or so the cable runs under a field, but then it reaches a road. This is a very wet part of the world. The mountains a few kilometres to the west sometimes get 3 m of rain in a year, so the narrow roads are edged by deep ditches. The grey cables are simply dropped into these ditches, and you can see them snaking along, in amongst the reeds and tadpoles and empty whisky bottles. About 5 km to the east, the cable abruptly turns north and runs for about a kilometre under an arm of the sea, emerging somewhere near the local telephone exchange, where the technology goes up a notch and we join the national fibre-optic network.

I expect my broadband to be slow, but a couple of weeks ago, when I was thinking about this article, it became maddeningly erratic, and voices over the telephone became strangely muffled, which I ascribed to my advancing years. A man was sent by my telecomms provider, and he spent a whole day replacing what he called 'wet joints' between my house and the exchange. My broadband is now completely reliable and I feel years younger. To test this great technological leap forward, I serendipitously decided to go to the Mineralogical Society's archive and have a look at the very first paper published in *Mineralogical Magazine*. By a strange coincidence I found myself back in a world dogged by telecomms problems.

The opening lines of issue 1, volume 1, of *Mineralogical Magazine*, August 1876, the first words of the world's first properly scientific mineralogical journal, are reproduced nearby. The new journal was followed in March 1878 by what was then called *Bulletin de la Société minéralogique de France*, now subsumed in *European Journal of Mineralogy*. The Min Mag article by Marshall Hall is unexpectedly interesting. It relates how the cable-laying steamship *Faraday* is in the Mid-Atlantic, at latitude 50°30′ N, longitude 24°46′ W, 'grappling for the broken telegraph cable'. The broken cable is clearly world news, so no further explanation is needed. The grapple brings up a 9.5 kg lump of black basalt, which is passed to a Mr J. Clifton Ward who makes a thin section, which he views using polarized light. Min Mag provides illustrations in colour, something that has become commonplace only in the last decade and for which we are still charged extra by some journals! It was only in 1849 that Henry Clifton Sorby had introduced the use of thin sections, and microscopes fitted with Nicol prisms, to geology, so the Min Mag article was state-of-the-art petrography. Ward identifies augite and olivine (see his drawing) and white needles of plagioclase showing 'longitudinal banding when more highly magnified', but he cannot give a name to 'a good deal of a very dark brown or black patchy substance, probably an irony product of decomposition', which I think we would recognize as altered glass.

J. Clifton Ward's drawing of basalt brought up by the *Faraday* from 2242 fathoms (13,542 feet, 4100 m) in the North Atlantic



A cluster of plagioclase crystals, between crossed polarizers. The section seems to have been on the thick side.

THE MINERALOGICAL MAGAZINE
AND
JOURNAL
OF THE
MINERALOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

No. I.	AUGUST, 1876.	Vol. I.

I.—*Note upon a portion of Basalt from Mid-Atlantic.*

By Marshall Hall, F.G.S.

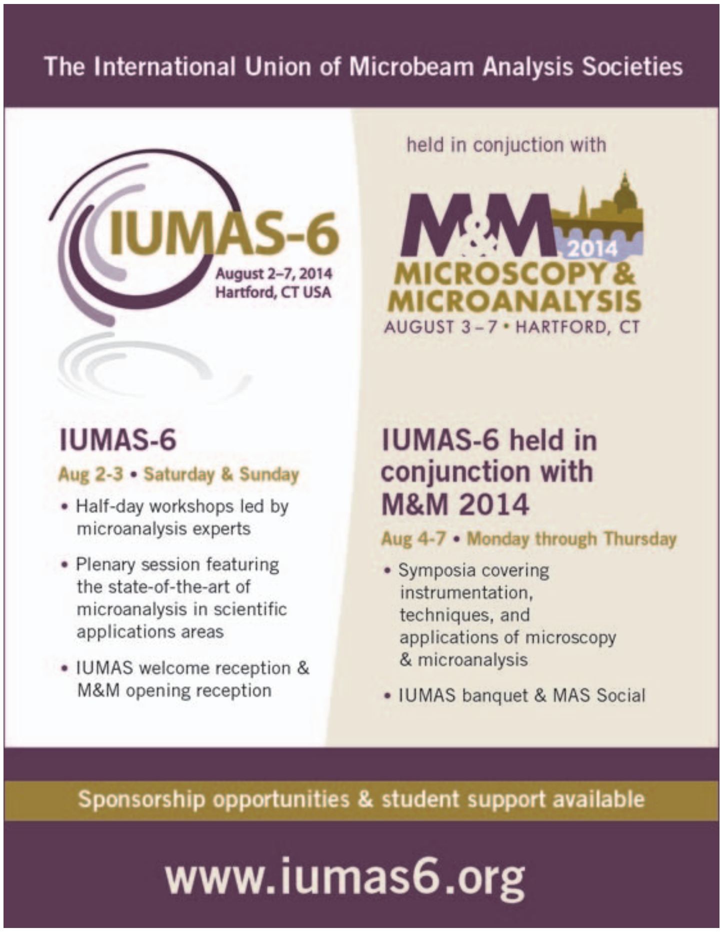
In the year 1874 the steamship *Faraday* whilst engaged in grappling for the broken telegraph cable, caught the strong claws of the grapple in a rock, which resisted with the strain of about 27·5 tons, to which any but a rope of marvellously perfect manufacture would have yielded. As it was, the rock gave way, and a lump of black basalt came up weighing 21 lbs. This mass shewed signs of having been torn off. The fragment, and the section made from it for the microscope which accompanies this memorandum, were submitted to Mr. J. Clifton Ward, who has kindly examined the specimen, and drawn up the report enclosed herewith.

The discovery of basalt on the ocean floor causes consternation. Ward suggests that 'as it is possible that the mass of basalt from which the specimen was chipped had been floated southwards on ice, the microscopic examination of some of the northern basaltic tracts might indicate the parent rock'. I fear that all the techniques of chemical and isotopic analysis available today might well fail in that task! To establish whether it is feasible for ice to have carried it to the position from which it was collected, Marshall Hall consults a Dr John Rae. Rae responds that 'he is not aware of icebergs having been seen about that spot, but that such an occurrence is not impossible'. Hall and Rae agree that the basalt is most likely to have been 'wrenched off some submarine peak'.

Canadian and Scottish readers will know about John Rae. He is my greatest hero, a relatively unknown traveller whose explorations of northern Canada far outshine the Arctic exploits of Peary and Amundsen. Born in 1813 in the tiny village of Orphir in the Orkney Isles, off the north-eastern tip of mainland Scotland, Rae graduated as a surgeon from Edinburgh University in 1833. His father, also John, was made the Orkney agent of the Hudson's Bay Company in 1819. The company's supply ships would call there before crossing the Atlantic. Rae junior signed on for a single season as surgeon on an HBC ship heading for James Bay, at the southern end of Hudson Bay, but as luck would have it, the sea ice came early and Rae had to winter on bleak Charlton Island. He enjoyed it so much that he remained at Moose Factory on James Bay for ten years! He learned the hunting and survival skills of the local Inuit people, for whom he had great respect, and dressed like them. On behalf of the HBC he undertook a number of extraordinary journeys of exploration in the enormous wilderness of northern Canada and its Arctic islands, travelling in small parties and living off the land. In 1844–1845 he walked 1200 miles (1930 km) in two months, earning the nickname 'Aglooka' – 'he who takes long strides' – from the Inuit. He was involved in the search for the Franklin expedition and was condemned by the British establishment for suggesting that members of Her Majesty's Royal Navy had resorted to cannibalism.

Telecomms entered Rae's life again in 1860 when the Atlantic cable failed (again). A new route was sought through Faroe, Iceland and Greenland, and he was sent to assess the landward part of the route. Then, in 1884, aged 71, he was involved in a project to investigate the possibility of a telegraph route through British Columbia to Siberia, and explored a great length of the mighty Fraser River, without a guide, using a dugout canoe. This great man died in London in 1893, in his 80th year. His only memorial is a statue in St Magnus Cathedral in Kirkwall, Orkney, showing him lying down as in the open, wearing his Arctic travelling clothes, a gun at his side.

Ian Parsons, University of Edinburgh



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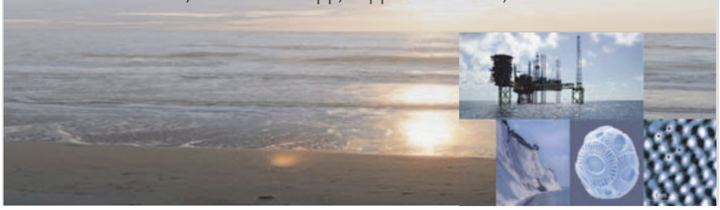

ELECTRON MICROPROBE OPERATOR – TEXAS A&M UNIVERSITY

The Department of Geology & Geophysics at Texas A&M University (TAMU), College Station, Texas is seeking applicants for an individual to oversee the operation of the Cameca SX-50 electron microprobe (a proposal to fund the purchase of a new instrument is under review). We seek a qualified individual with demonstrated experience in the operation and maintenance of an electron microprobe. Applicants should have an advanced degree in geological sciences or a related field; a PhD is preferred for the position of Assistant Research Scientist, although we will consider qualified applicants with a MS degree for a Research Associate position. Applicants must have experience operating an electron microprobe, familiarity with the theory of electron microanalysis, and the ability to effectively interact with other scientists and students. Some knowledge of electronics and computer hardware and software is preferred. The successful candidate will be expected to: (1) Instruct users on the operation and theory of the electron microprobe, including teaching an annual course; (2) assist users on a daily basis to obtain high-quality analytical results and to interpret these results; (3) supervise, manage, and maintain the electron microprobe facility. The primary focus of the position is to maintain and enhance the capabilities of this facility and to assist TAMU and outside users. However, the successful candidate will be encouraged to conduct research and submit competitive funding proposals, as time permits, and will likely find a variety of possibilities for collaborative research.

The competitive salary will be commensurate with experience. To apply, send a cover letter, CV, brief statement of technical and research interests and accomplishments, and contact information for three referees to Dr. Will Lamb at w-lamb@geos.tamu.edu. Review of applications will begin immediately with a desired start date of January 1, 2014. For more information contact Will Lamb via email or at (979) 845-3075.

Texas A&M University is an affirmative action/equal opportunity employer committed to excellence through the recruitment and retention of a diverse faculty and student body and compliance with the Americans with Disabilities Act. We encourage applications from minorities, women, veterans, and persons with disabilities. Texas A&M University also has a policy of being responsive to the needs of dual-career partners (http://employees.tamu.edu/Jobs/careers/dcsDetails.aspx).

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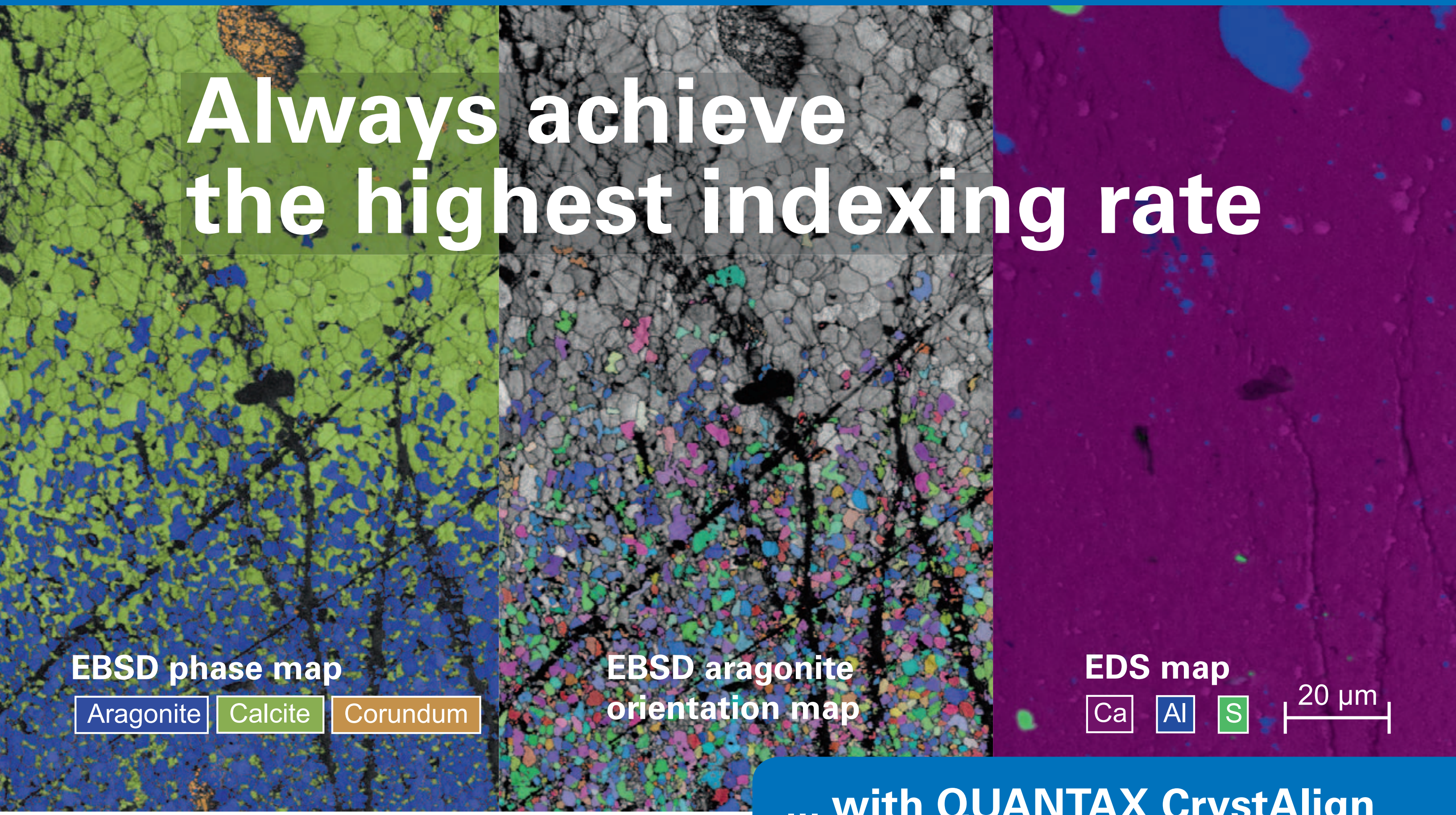

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The images above show a sample from a high pressure experiment. It was conducted with a multianvil press in order to investigate how deformation textures are affected by phase transformations. An EBSD phase map (raw data), an EBSD orientation map (IPF-X, only aragonite selected) and an EDS map of the same area are shown from left to right. Both EBSD datasets overlay the pattern quality map. The simultaneous EDS and EBSD measurement ensures conclusive results (calcite and aragonite can only be distinguished using EBSD).
Sample courtesy of Dr. Florian Heidelbach, Bayerisches Geoinstitut, Universität Bayreuth.

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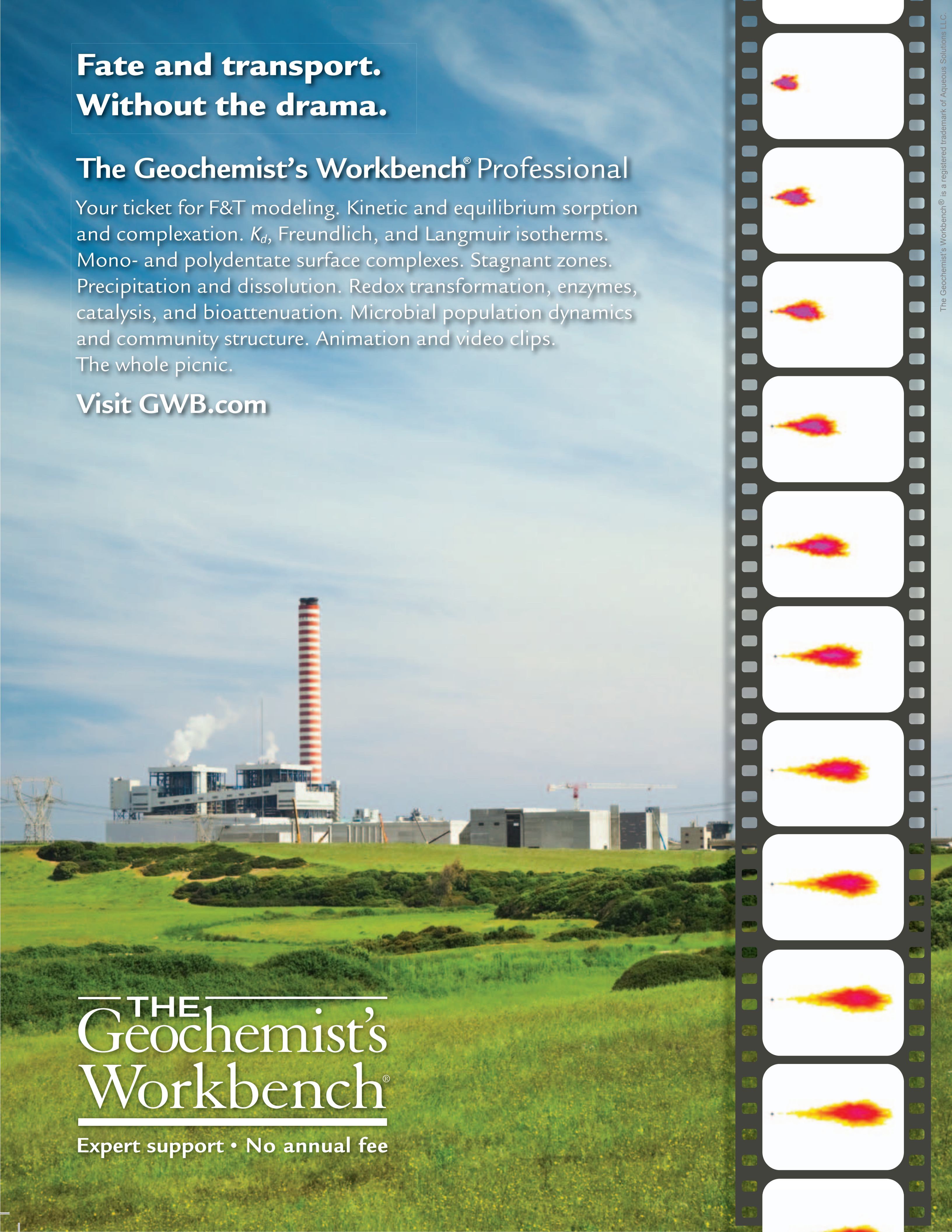
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