DEPARTMENT OF geosciences AT VIRGINIA TECH Newsletter

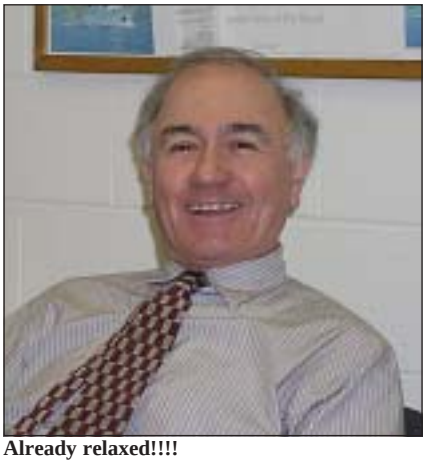
Virginia Polytechnic Institute and State University *SPRING 2004*

Time for Change

by Cahit Çoruh

Greetings from Blacksburg! I would like to begin by saying that I have enjoyed communicating with you via the newsletter for almost ten years. Writing this message gives me great pleasure for many reasons. Here's the top ten:

First, the support of alumni and friends has helped us in rebuilding the department, enhancing our curricula for the options (geology, geophysics, geochemistry, earth science education) offered under the umbrella of geosciences, and providing more financial support in terms of scholarships to our students. It is a great pleasure to thank the faculty, alumni, staff, students, and friends for these achievements.



Already relaxed!!!!

Second, as reported in earlier issues, faculty, students, and staff of your department managed to reach the highest combined productivity level in the last fifteen years in terms of scholarships, graduate student enrollment, and external funding. In addition, the undergraduate experience was also enhanced. The external research grant level has increased about 500 percent since 1998. With thanks and much gratitude, I commend the faculty, graduate students, and staff.

Third, in addition to named endowed scholarship funds (see page 23) established by our alumni and friends, the department has accumulated small but meaningful contributions from alumni and friends in the Geosciences Endowed Scholarship fund. This

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Virginia Tech Crystallography Laboratory *(VTX) Expands Again*

by Ross Angel

The Virginia Tech Crystallography Laboratory, housed in Derring Hall has seen an expansion in both staff and equipment over the last year. Founded by the Department of Geosciences upon the arrival of Professors Nancy Ross and Ross Angel in 2000 and 2001, the laboratory was established with two single-crystal X-ray diffractometers devoted to studying the structures and properties of minerals at high pressures. In 2002, this Geosciences component was joined by the Department of Chemistry who installed their newly-purchased diffractometer for studying the structure of small molecules, and the laboratory became a "co-located facility of the two departments" (see the Fall 2002 newsletter). The summer of 2003 saw the purchase by the University and the Department of Biology of a diffractometer from Oxford Diffraction that will enable us to determine the structures of macro-molecules and proteins and thereby support the University's major initiative in structural biology. The purchase of this third instrument from Oxford Diffraction led the company to promote us to being their one and only "Platinum Level Reference Site" in the USA. The reference site agreement allows Oxford Diffraction to sponsor the laboratory both financially and via extensive technical support and service, while they are able to use the laboratory as a demonstration facility for potential customers.

The company also sponsored the first Virginia Tech Crystallography Workshop in July 2003 that attracted six faculty and 11 summer research students from four different colleges in Virginia: Washington and Lee University, University of Richmond, James Madison University and Ferrum College. Participants were given a one-day crash-course in crystallography and then spent

Please see VTX, page 15

Alumni Careers
Ronald E. Harris '80, PG
March 26, 2004

Greetings to all current and past Hokies! I have prepared a brief summary of the past 23 years in hopes of hearing from fellow alumni and faculty friends. My apologies in advance for a general lack of entertainment value, but considering the subject material I had to work with, it is at least, hopefully, painless.

As a graduate from Virginia Tech in 1980 with a B.S. in geology, I have approximately 23 years of experience, and hold professional geologist certifications/registrations in three states. My special interests in membrane technology include expanding groundwater exploration in coastal settings where salt – brackish - fresh groundwater relationships are only partially understood. The critical thinking, problem solving, enthusiastic instruction, and leadership provided by my half-decade VT experience have paved the way for a very diverse and successful career.

I am currently in the position of Chief of Water Resources for Newport News Waterworks, a regional water utility serving over 360,000 customers. As a project manager, I have dealt with most of the major implementation issues facing desalting technologies, groundwater availability, and water supply in general. In this capacity, I have managed the permitting, preliminary design, design, and construction of a 6-mgd reverse osmosis membrane desalting facility. The supply and treatment facilities have been on-line since late 1998. As part of the strategic planning team for Waterworks, I have also dealt with demand, revenue, and operating cost issues. In addition to project manager, I serve as the primary steward of a five reservoir and river intake system, our watersheds, and well fields.

Twenty-two days after graduating, I reported for work in the oil industry. This roller coaster ride lasted for nine years, all in domestic exploration with Cities Service (Citgo) and Occidental (Oxy USA) in the post-merger years. Two oil and gas discoveries (deep gas in the Mississippi salt basin, and oil/condensate in the North Louisiana Smackover/Haynesville trend) during this period highlight an early career that was exciting, fulfilling and at times frustrating. When the fourth move in nine years listed Bakersfield, California as our destination, Patti and I realized we needed to be closer to (rather than farther from) Virginia.

In 1989 we relocated to Virginia with Malcolm Pirnie Engineers where I directed the geosciences group here in Newport News. In 1993, the city offered a position in water resources and I have been with Waterworks for the last 11 years. I have also served on the Board of Directors for the American Membrane Technology Association (AMTA, formerly American Desalting Association).

We have two children whose enthusiasm and talents routinely humble their father. Stephanie, a junior at Virginia Tech studying biology and chemistry, manages to stay on the Dean's list, a feat that eluded her father for all but one quarter. Our son Thomas, a high school sophomore, rebuilds and races off-road motorcycles (yikes)! So far neither has experienced the joy of serving as Geology Club President !! (Did I mention that we held our annual meeting in 1979 in New River Cave?) My lovely wife, Patti, manages a busy dental practice, nurtures our children, makes a killer spinach dip, and completely spoils our two labs Harry and Sally.

Taut lines and regards to all.

Ronald E. Harris
808 Westgate Court
Newport News, Virginia 23602

Response to Jim Spotila's New Field Course Article

Dear Dr. Spotila:

The article about the new field course in the current (Fall 2003) Geosciences Newsletter is very interesting. It is difficult to imagine geology being taught without frequent fieldtrips. When I was a geology undergraduate at Tech, excursions into the field were taken on many Saturdays. We would all pile into cars and head out for outcrops revealing folds, faults, fossils and various lithologies.

One of the most memorable sites we visited was a favorite location of Dr. Sears (as I recall). It was a large exposure of metamorphic rock and Dr. Sears thought that if enough students spent enough time splitting enough rock, someone would eventually find a fossil. He wanted to know the age of the original sedimentary rock. We were running late the day we were there and by the time we left we were holding rock samples in the headlights of the cars to look for fossils. It seemed like a quixotic quest but, being good Tech geology students, we humored the professor and diligently searched.

I have many fond memories of my years in geology at Tech!

Richard Leary '59
837 Roanoke Dr.
Springfield, IL 62702

Alumni Careers
Michael R. Mason '89
CES, PG (MAJ, USA, RET)

I left VPI in June of 1989 to go to the Defense Mapping Agency (now called the National Imagery and Mapping Agency). There, I furthered my education with the Joint Space Intelligence Operations Course, Geographic Information Systems Course, and the Multi-Spectral Imagery Course. My duties entailed briefing pilots, bombardier-navigators, cruise missile operators, and special forces on the sources and proper usage of coordinates for targeting smart weapons.

I retired from the military in 1992 and went back to work in the nuclear power industry for two years. During that time I married my wife Sue. She has a daughter and we have two grandsons and a fantastic son-in-law.

We moved to Tennessee in 1994 and we are very happy here. We live in the country on 5+ acres of ridge top.

I ran a satellite tracking system and then moved into environmental engineering. A partner and I owned our own engineering company for two years. In 1997 I got back into

Michael Mason in field

geophysics with a move into radiological and unexploded ordnance digital geophysical mapping. Most UXO geophysics is centered on active electromagnetics, "EM," and passive magnetometers, "MAG." There is a SEVERE shortage of geophysicists in the UXO industry. If any of your students show an interest in looking for unexploded ordnance, please let me know and I will forward a list of contacts involved in this worthy enterprise (including the Army Corps of Engineers).

I now work for a company that does design-build for integrated digital geophysical mapping systems (*http://www.ris-corp.com*). Most of the folks here are electronic engineers. My role is to design platforms, write processing code, transition the systems to the field, and to train the geophysicists and operators.

Michael R. Mason, CES, PG
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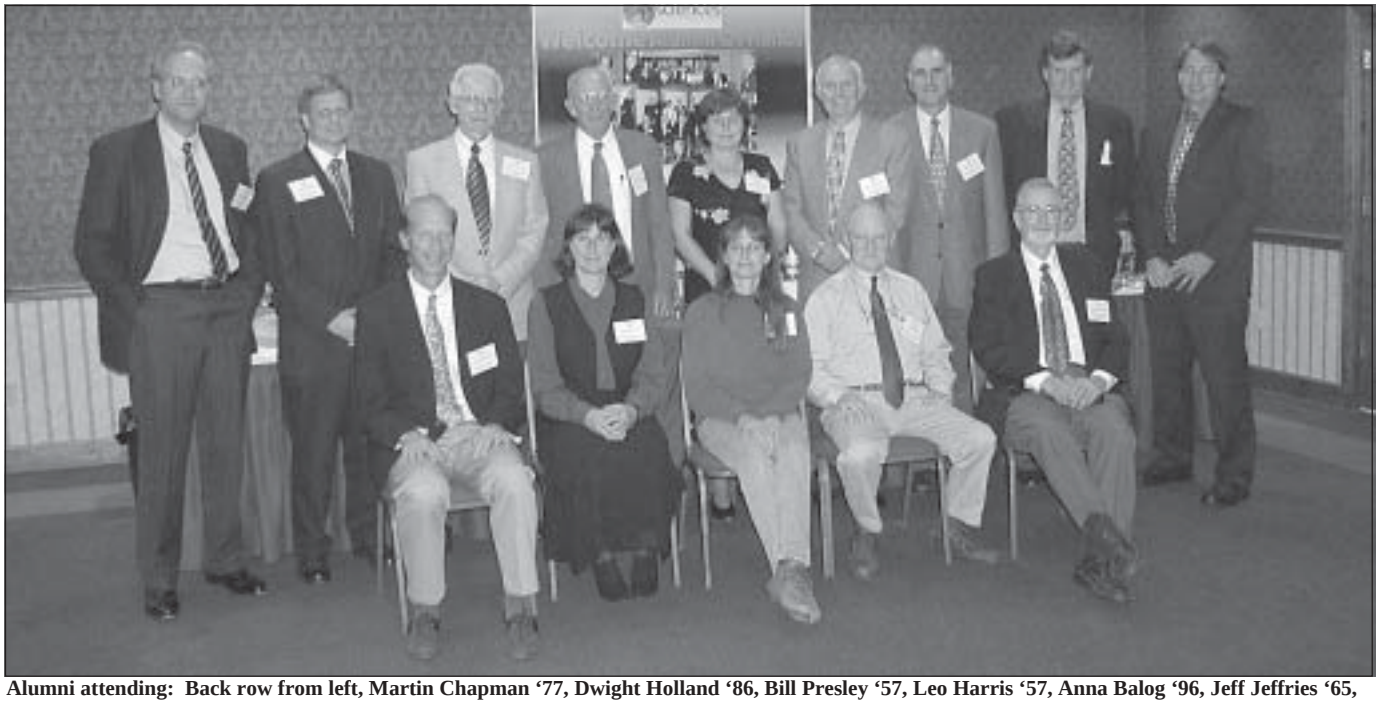
Alumni-Faculty



Alumni attending: Back row from left, Martin Chapman '77, Dwight Holland '86, Bill Presley '57, Leo Harris '57, Anna Balog '96, Jeff Jeffries '65, Bill Hazlett '68, John Wood '54, John Chermak '86; Front row from left, Mike Hochella '76, Nancy Ross '79, Edie Tamburro '85, Fred Webb '59, Lynn Glover '52

2004 Alumni-Faculty Dinner
October 22, 2004

Mark your calendar!

Don't forget to reserve time on your calendar for the Alumni-Faculty Dinner at the Blacksburg Country Club on October 22, 2004. The Social begins at 6:00 P.M. and the Buffet Dinner at 6:45 P.M. We have reserved a block of rooms at the Hampton Inn and Microtel Inn & Suites, both in the NRV mall area with great room rates.

Hampton Inn (540-381-5874); $74 plus tax per night – ask for "VT Geosciences" block
Microtel Inn & Suites (540-381-0500); $39.95 plus tax per night – ask for "GEO" block

Call some classmates and friends that you haven't seen for a while and meet them here! More details will arrive later.

Homecoming Dinner 2003

From left: Wallace Lowry, Professor Emeritus and Leo Harris '57 reminiscing

Foreground: Fred Webb '59 in animated conversation with Sue Ellen Rocovich; Background left to right: Melva Harris, Ellen Glover and Elizabeth "Dit" Holden Rocovich

Foreground holding flowers: Elizabeth "Dit" Holden Rocovich, daughter of Dr. Roy J. Holden, founding head of the Department of Geology in 1905; left to right, Sue Ellen Rocovich and Elizabeth Rocovich, daughter-in-law and grandaughter of "Dit"

Buffet table from left side: Matthias Imhof, Nancy Romero, Don Rimstidt, Bill Presley '57, Jeff Jeffries '65, Barbara Webb; End of table: Martin Chapman '77, Anna Balog '96, Right side of table: Dee Jeffries

Paul Ribbe

by Ross Angel

Go into the office of any of our faculty or students who are mineralogists or geochemists and there on the bookcase you are certain to find a row of well-thumbed paperback books with stunningly white covers. This is true not only in our department, but also throughout the universities and colleges in the United States. Indeed, many tens of thousands of these volumes grace academic bookshelves all over the world. The mineralogists among our alumni will have already recognized the description of the book series *Reviews in Mineralogy and Geochemistry* that Paul Ribbe created and then guided as series editor and contributor over the past 30 years. They have become one of the widest-known and most consistent advertisements for the scholarship of our department.

The series that has now reached 54 volumes was begun as the Mineralogical Society of America's (MSA's) *Short Course Notes*. Paul Ribbe organized the first two courses and edited the first two volumes (*Sulfides*, 1974; *Feldspar Mineralogy*, 1975). The volumes accompanied short courses of the same names held in association with the annual meetings of the Geological Society of America. Subsequent courses and books were a big hit with researchers, professors and grad students, and MSA institutionalized them, rarely missing a year in which at least one short course and volume appeared. In 1980 ISI's Science Citation Index asked if they could reference the books, by this time called *Reviews in Mineralogy*, and MSA asked Paul to be Series Editor, to guarantee continuity and maintain quality. Citation ratings came to exceed those of most mineralogy/petrology journals.

The *Reviews* series contains volumes on most of the rock-forming mineral groups (silicates, oxides, phosphates, sulfates, carbonates, etc.), certain elements of geochemical importance (B, Be, stable isotopes, noble gases, rare-earths, U), techniques important to study of earth materials (X-ray diffraction—powder, high-P and high-T; transmission electron microscopy, spectroscopic methods, etc.); subjects which have become graduate-level textbooks (e.g., mathematical crystallography, kinetics of geochemical processes, igneous and metamorphic petrology, thermodynamic modeling, crystal chemistry, fluid inclusions), encyclopedic compilations (*Planetary Materials, Silica*), and many specialty topics (chemical weathering, the mineral-water interface, silicate melts, health effects of mineral dusts, volatiles in magmas, transformation processes, reactive transport, nanoparticles, plastic deformation, geomicrobiology, and biomineralization). Given the range of the series it is no surprise to find that Virginia Tech faculty and alumni have been amongst the most prolific contributors to the volumes as both authors of chapters and editors of individual volumes as you can see from the list on page seven.

Paul Ribbe

In the year 2000, following the initiative of our own Mike Hochella as then President of the Geochemical Society, the series became a joint publication of MSA and the Geochemical Society and was appropriately renamed *Reviews in Mineralogy and Geochemistry*. Jodi Junta Rosso (Ph.D. 1994 - Stanford, and a post-doc with Don Rimstidt) became Series Editor for the Geochemical Society. This year she took over the entire job for both societies, when Paul Ribbe formally retired.

Paul was awarded MSA's Distinguished Public Service Medal in 1993 and the Mineralogical Society of Great Britain and Ireland's Schlumberger Medal for "scientific excellence in mineralogy and its applications" in 1995, both largely for his work with *Reviews in Mineralogy*. The Council of the Mineralogical Society of America will be further honoring Paul's service to the MSA and the entire mineralogical community by sponsoring a symposium in his name at the Fall 2004 GSA meeting which will be held in Denver, Colorado from November 7th to November 10th. For this symposium, we have invited four internationally recognized scientists to give keynote lectures to reflect the broad spectrum of the content of the *Reviews*. Of the four, Patricia Dove is both a VT alumni and current member of the faculty and will talk on recent advances in the fields of biomineralogy. Mickey Gunter, another VT alumni and now Professor of Mineralogy at the University of Idaho will talk on Environmental Mineralogy. They will be joined by major *Reviews* contributors Professor M. Ghiorso (University of Washington) and Professor F. Hawthorne (University of Manitoba). Ross Angel is convening the session, so please contact him by e-mail at *rangel@vt.edu*, phone (540)231-7974 for further details, or visit the GSA web site at *http://www.geosociety.org/meetings/*. If you wish to contribute a paper to the session, and join us in this celebration of Paul's career and service, then you should submit an abstract to the GSA web site before July 13th.

Virginia Tech's individual contributions to *Reviews in Mineralogy*

1. Sulfides	Jim Craig, Paul Ribbe (Editor)
2. Feldspar Mineralogy	Paul Ribbe (Editor and author of 5 chapters)
5. Orthosilicates	Paul Ribbe, Alex Speer (Ph.D. 1973), Gordon Brown (Ph.D. 1970)
7. Pyroxenes	Maryellen Cameron (Ph.D 1972)
9B. Amphiboles	Charles Gilbert (faculty 1968 - 1983), David Wones (faculty 1977 - 1984), Bob Popp (Ph.D. 1975)
10. Metamorphism	Bob Tracy
13. Micas	Dave Hewitt (faculty 1975 - 1998), David Wones, Alex Speer
15. Mathematical Crystallography	Monograph by Monte Boisen (Adjunct Professor until 2002), Jerry Gibbs
18. Spectroscopic Methods	Mike Hochella, Gordon Brown
23. Mineral-Water Interface Geochemistry	Mike Hochella, Gordon Brown
26. Contact Metamorphism	Bob Tracy
28. Health Effects of Mineral Dusts	Mike Hochella
29. Silica	Jerry Gibbs, Bob Downs (Ph.D. 1993), Patricia Dove, Don Rimstidt, John Higgins (Ph.D. 1978)
31. Chemical Weathering	Patricia Dove, Mike Hochella
37. Ultra-High Pressure Mineralogy	Bob Downs
39. Transformation Processes in Minerals	Ross Angel
41. High-Temperature and High-Pressure Crystal Chemistry	Ross Angel, Bob Downs, Nancy Ross, Ron Peterson (Ph.D. 1980), Joe Smyth (B.S. 1966)
42. Molecular Modeling Theory	Monte Boisen, Jerry Gibbs, Kevin Rosso (Ph.D. 1998)
45. Natural Zeolites	Mickey Gunter (Ph.D. 1987)
48. Phosphates	John Rakovan (Post-doc), Mickey Gunter
49. Applications of Synchrotron Radiation	Gordon Brown
50. Beryllium	Mark Barton (M.S. 1978)
53. Zircon	Jay Thomas (Ph.D. 2002), Bob Bodnar
54. Biomineralization	Patricia Dove

The Geology Club

The Geology Club at Virginia Tech is enjoying a new Student Lounge/Lab provided by the department. It has three computers for internet research and checking e-mail. There are also several large tables for completing homework and studying.

The club has short-sleeved and long-sleeved t-shirts with the new department logo on the front and a new "Watch for Falling Geologists" design on the back. We will also be taking orders for embroidered baseball caps with the department logo. Contact Keith Rodgers (vice-president) at *jarodger@vt.edu* if you would like a shirt or hat.

The Geology Club has plans to visit the Smithsonian Museum of Natural History and other museums shortly after commencement in May.We are also working on a budget for a two-week trip early in the summer to the Southwestern United States. We hope to apply for funds from the Student Government Association. We plan to visit sites of geologic interest and the Geoscience departments of nearby universities.

The current officers would like to invite all interested undergraduates and graduates of all majors to join the club (officer's e-mails available on the Officer page of the website). Visit the club's website to find out how! *http://filebox.vt.edu/org/VTGeologyClub/*

Change, continued from page 1

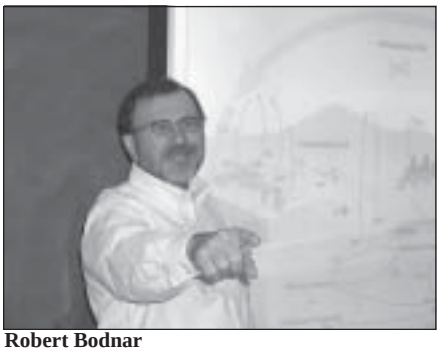
scholarship was originally established by contributions from Dr. Lynn Glover III '52, Emeritus Professor and Chair of the Alumni Relations Committee. It is a great pleasure to share the following from recipients of the Alumni Geosciences Scholarships as echoes of your support. A recipient (E.G) writes, "I am writing to show my deepest appreciation for awarding me the Alumni Geosciences Scholarship and the Academic Excellence award for the spring semester 2004. I am truly enjoying my education in geology and to receive such support from such a wonderful department is endlessly inspiring. Each semester, as I become more familiar with the faculty in the department and the facilities available to the geoscience student body, I am continually impressed and invigorated. I will continue to do my best for the rest of my stay here at Virginia Tech in the Department of Geosciences. Again, thank you for your support – I cannot thank you enough." Another recipient (J.S.) writes, "I just wanted to thank you for awarding me the Academic Excellence award to offset the tuition increase. You don't know how much that brightened up the day. Seeing that letter in the mail was one of the best things that has happened this semester. I know you work very hard to get that money to reward the students in the department. It is much appreciated. Thank you again for all you do for the department and students in it!" Another recipient (K.W.) writes, "Thank you so much for considering and choosing me as the recipient of the money from the alumni. It was an honor to have even been regarded as a student worthy of such an unexpected gift. It will definitely help alleviate the rising tuition rates and was greatly appreciated."

On behalf of the department and students, many thanks for your contributions. The above comments are very gratifying indeed. Please note that no amount is considered small because small contributions transform into "big" support by "integration" for deserving students. I would like to remind you that you can pick any endowed fund listed on page 23 to direct your contributions "tall, grande, or venti."

Fourth, the title of this message expresses my thoughts and feelings . . . it is time for a change! It is my great pleasure to introduce the new departmental administration starting August 15, 2004. After receiving input from the faculty, Dean Chang appointed Dr. Robert (Bob) Bodnar, University Distinguished Professor and C. C. Garvin Professor of Geochemistry, as the Chair and Dr. J. Donald (Don) Rimstidt, Professor of Geochemistry and Assistant Chair, as the Administrative Chair. As Dean Chang wrote, "We are fortunate that we have two outstanding individuals who have agreed to serve the department. Both of these individuals possess unique qualifications and strengths, and what is more important, they complement each other well." We (Bob, Don, and I) have already started working together for the smoothest transition one can imagine. My great pleasure comes from the fact that moving the department to a higher level is very feasible under the new leadership.

Fifth, I would like to recognize the contributions of the Alumni Relations Committee (Emeritus Professors Lynn Glover, Don Bloss, and John Costain, Professor Krishna Sinha, and Mary McMurray) for building better and stronger bridges between the alumni and department. I send a special thanks to Lynn Glover for his enduring leadership and contributions.

As a broadening of alumni relations, we recently (April 3, 2004) had our second alumni-faculty dinner/ meeting in Houston. This was the first event of the Houston Area Virginia Tech Geosciences Support Group coordinated by Mike Strickler ('83). On behalf of the department, I thank Mike and his working group for organizing the meeting and alumni and friends who attended the dinner. As usual, we have received excellent comments on ways to enhance alumni-department relations, especially in the area of networking that could result in finding internships for our students and potential jobs for our alumni. The Houston Area Virginia Tech Geosciences Support Group is already a model (see page 22) for organizing similar group meetings in other areas.



Robert Bodnar

Donald Rimstidt

Sixth, it is a pleasure to thank John Costain for managing, on a regular basis, to pull me away from administrative issues and involve me in research topics and book writing. Our endless discussions on exploration seismology helped me continue learning and most always improved my mood.

Seventh, this is an excellent opportunity for me to publicly thank the Advisory Board members for their advice, warnings, and contributions. By mentioning names I extend my deepest appreciation to the Advisory Board members: James Aldrich (Geology and Geochemistry Group Leader, Earth and Environmental Sciences, Los Alamos National Laboratory), Mike Bahorich (Vice President of Apache Corporation and Past President of the Society of Exploration Geophysicists), John Grotzinger (Professor of Geology, Massachusetts Institute of Technology), Thomas Jeffries III (Technology Advisor, Exxon Exploration, retired), Gordon Matheson (President and CEO, Schnabel Engineering Associates, Gaithersburg, Maryland), Lawrence (Eddie) Meade, Jr. (Senior Vice President of Electric Fuels Corporation, Kingsport, Tennessee), Matthew Mikulich, (Chevron, Corporation Chief

Geophysicist and Technical Advisor, retired), James Niemann (Well Modeling and Drill Processing Team Leader, Chevron USA Inc.), and Warren Wood (Research Hydrologist, US Geological Survey). I should note that Dr. Matthew Mikulich was especially instrumental in forming the Advisory Board and preparing its charter. What can I say other than thank you all! You have provided invaluable input through meetings and reports on many critical issues.

Eighth, for almost ten years, I have had the pleasure of working with a great support staff. I would now like to thank my "office family" known as "harem" — five wonderful and skillful ladies: Linda Bland, Connie Lowe, Ellen Mathena, Mary McMurray, and last but not least Carolyn Williams. They managed to keep me in the main office for the last ten years with their smiles and dedication for the betterment of the department.

Ninth, my greatest pleasure comes from the reality that in spite of many difficulties and frustrations I have enjoyed my tenure as the Chair—serving the stakeholders, faculty, staff, students, alumni, and friends, while enjoying the support from the college and university. Of course my pleasure cannot be real without recognizing the leadership and friendship of Dr. Lay Nam Chang, Dean of the College of Science.

Tenth, this is the BIG one! A most special and heartfelt thanks to Dilek, my wife, and Basak, my daughter. I could not have served the department this long without their understanding, help, and support.

Thank you all and goodbye!

Thomas Tabb Jeffries Geological Sciences Endowed Scholarship

Thomas Tabb "Jeff" Jeffries III and his wife, Dee, have established the Thomas Tabb Jeffries Geological Sciences Endowed Scholarship to honor Jeff's father, Thomas Tabb Jeffries, Jr. and to perpetuate the family's tradition of supporting Virginia Tech. The purpose of the scholarship is to support the studies of undergraduate or graduate students in the geosciences who have demonstrated academic merit and leadership within the Geosciences Department or the University.

Thomas Tabb Jeffries Jr., born in 1912, grew up in Richmond, Virginia, and attended John Marshall High School. Tom graduated from Virginia Polytechnic Institute in 1936 with a degree in Industrial Engineering. While at VPI, he was an officer of "I" Battery in the Cadet Corps, a member of the Cotillion Club, and of the Omicron Delta Kappa National Leadership Honor Fraternity.

After graduation from VPI, Tom moved to Baltimore, Maryland, married Martha Dreyer, and went to work for Bethlehem Steel Corporation's ship building and repair yard. Despite the demands of his job as Assistant to the General Manager, he served as trustee of the Linthicum Heights Methodist Church, and co-founded Boy Scout Troop 822, serving for 19 years on its Executive Committee. After retiring,

Thomas Tabb Jeffries Jr.

Tom stayed active as a marine consultant and as secretary of The Maryland Marine Club, a professional society. He filled up "spare time" with golf, fishing, and travel. Visiting Blacksburg over the decades, Tom was amazed at the growth of the campus and the town. He died in Baltimore in 2001 at age 89.

Jeff graduated from Virginia Tech in 1965 with a degree in Geophysics, one of the very first of these degrees offered by the University. He was a member of the Cadet Corps for two years, and a member of the German Club, and the Geology Club. After graduation, Jeff joined the Exxon Corp and retired as Geoscience Technology Advisor for Exxon's affiliates in the Far East and Australia. Thirty-four years with Exxon gave Jeff and Dee the opportunity to live as expatriates on assignments in Singapore, Indonesia, and China.

Jeff has supported Virginia Tech by recruiting geoscientists for Exxon and serving for five years on the Department of Geosciences Advisory Board. Currently he serves as a member of the Dean's Roundtable for the College of Science.

Jeff and Dee are busy restoring their waterfront home on Kent Island, Maryland. In addition to gardening, golf, genealogy, and visiting friends, Jeff is involved in conservation as a Director of the Cove Creek Conservation and Wildlife Foundation on Kent Island. Even after years of overseas living, Jeff and Dee still enjoy travel and plan to visit Tuscany and Umbria this spring.

Jeff and Dee Jeffries

Ninth Annual Virginia Tech Geological Sciences Student Research Symposium March 18 & 19, 2004

The Geological Sciences Student Research Symposium (GSSRS) is an annual event produced and organized by the students and faculty of the Department of Geosciences at Virginia Tech. The symposium is held in thegeosciences seminar room and provides an opportunity for the public to learn more about research topics currently being investigated in the geosciences by graduate and undergraduate students at Virginia Tech. It also provides students an opportunity to prepare and present professional geoscience talks in a friendly atmosphere.

Contributions were received from ExxonMobil, ConocoPhillips, ChevronTexaco, Virginia Tech Department of Geosciences, Andrew Bush, Tracy Cail, Treavor Kendall, Jason Reed, Eric and Maria Rufe, and Shelley E. Tyree. The committee would like to thank all of the contributors and the faculty members who evaluated their presentations.

Presentations were given by the following students.

Amanda Albright-Olsen (Ph.D.)	Ligand Promoted Dissolution: True or False?
Tristan Azbej (Ph.D.)	Critical PVTX Properties of Aqueous Solutions
Susan Barbour Wood (Ph.D.)	Time Averaging on a Shallow Subtropical Shelf
Steve Becker (Ph.D.)	Brine Migration in Chadian-Brigantian Carbonate Strata of SE Ireland
Dave Benson (Ph.D.)	Paleogeographic Reconstruction of a Trunk-Tributary Fluvial System, Lower Pennsylvanian Lee Formation, SW Virginia
Matt Benusa (B.S.)	Compressibility of Albite, $NaAlSi_3O_8$
Bob Bodek (M.S.)	Glacioeustatic Controls on Peat Accumulation: A Case Study From the Lower Pennsylvanian Pocahontas Formation, Southwest Virginia, USA
Saumyaditya Bose (Ph.D.)	Microbial Electron Transfer Mechanisms
Megan Brown (M.S.)	Using Geochemical and Taphonomic Signatures of Freshwater Mussel Shells to Explore Industry-Related Extirpations in the North Fork Holston River, VA
Jason Burt (Ph.D.)	Oceans in the Earth: Hydrogen in Nominally Anhydrous Minerals
Jamie Buscher (Ph.D.)	Understanding Transpression From Patterns of Rock Uplift Along the San Andreas Fault Zone, California
Claudia Cannatelli (Visiting Pre-doctoral Scholar)	Analysis of the Eruption of Mt. Etna, Italy, During Summer 2001 and Evidence for the Intrusion of Dikes by Geophysical and Seismological Computations
Michelle Casey (M.S.)	Continuing Research on the Magnetic Stratigraphy of the Upper Cretaceous (Campanian(?)-Maastrichtian) Maevarano Formation of Northwestern Madagascar
Brian Cook (Ph.D.)	Strain Symmetry at the Base of the Moine Nappe, NW Scotland: Implications for Material Flow Along Orogenic Strike
Laura DeMoe (M.S.)	Sequence Signature of a Distal Foreland Carbonate Ramp During Global Greenhouse; Ordovician, U.S. Appalachians
Lin Dong (Ph.D.)	Quantitative Analysis of Early Permian Fusulinids
Meredith Dunn (M.S.)	Relocation of Eastern Tennessee Earthquakes Using hypoDD
Megan Elwood Madden (Ph.D.)	Shock Reequilibration of Fluid Inclusions
Frank Evans (M.S.)	Magnetic Susceptibility Analysis of Upper Mississippian Paleosols: Paleoclimatic Implications
Andras Fall (M.S.)	Characteristics of Fluids in Alkaline Intrusive Rocks
Mary Harvey (B.S.)	Kinetics of Scorodite Dissolution
Sam Harvey (M.S.)	Thermal History of the Chesapeake Bay Impact Crater
Danielle Huminicki (Ph.D.)	The Effect of Secondary Precipitates on the Dissolution Rate of Calcite in AMD Solutions
John Huntley (Ph.D.)	Secular Patterns in Morphological Disparity and Body Size of Acritarchs Through the Neoproterozoic and Early Cambrian
Micah Jessup (Ph.D.)	Kinematic and Thermal Evolution of the High Himalayan Slab, Everest Massif, Tibet and Nepal

Brett Kiser (B.S.)	Syntectonic Granites and Transpressional Deformation at Pemaquid Point, Mid-Coast Maine
Rich Krause (Ph.D.)	Assessing the Usefulness of Literature-derived Estimates of Body Size
Angela Larson (M.S.)	Comparison of S-Wave Velocity Structure Beneath the Kaapvaal Craton From Surface-Wave Inversion With Predictions From Mantle Xenoliths
Deric Learman (Ph.D.)	Geochemical Influences on Contaminant Fate: a Study in Alma, Michigan
Alanna Lester (M.S.)	Nonlinear Dynamic Site Response for Earthquake Hazard Analysis in South Carolina
Fang Lin (Ph.D.)	Validation of Utilizing Aluminum Carbide-Water Reaction to Study Water-Methane System
Vik Liogys (Ph.D.)	Petrology of Garnet-Bearing Granulites of the Virginia Blue Ridge Terrane
Laura Lukes (M.S.)	Engaging Introductory Geology Students With Data: Comparing and Contrasting the Impact of Different Data Types on Student Learning in the Laboratory Classroom
Andy Madden (Ph.D.)	Testing Geochemical Reactivity as a Function of Mineral Size: Manganese Oxidation Promoted by Hematite Nanoparticles
Sailendra Mahapatra (Ph.D.)	Seismic Reservoir Characterization in Coalinga Field
Ari Mitra (Ph.D.)	Felsic Magmatism in Flood Basalt Provinces: A Study of the South Mountain (Catoctin) Hight Silica Rhyolites
Nicole Nackley (B.S.)	Hydrothermal Crystal Growth
Ethan Nowak (Ph.D.)	Fracture Illumination via Weighted Radon Transform
Jon Roller (M.S.)	Mechanisms and Kinetics of Arsenic Release From Iron Oxide Reduction
Adam Shumaker (M.S.)	Seismic Resolution of the Coast Plutonic Complex (CPC) in British Columbia
Ben Schwartz (M.S.)	Hydrologic Characterization of Sinkholes Using a Multi-Method Approach
Matthew Severs (Ph.D.)	Reequilibration of Fluid Inclusions in Topaz
Arvind Sharma (Ph.D.)	P-Wave Seismic Velocity Model of the San Andreas Fault Near Parkfield, California
Jennifer Stempien (Ph.D.)	Quantifying Geographic Variability of a Lineage: the Geometric Morphospace of *Mulinia*
Jon Trujillo (M.S.)	Extensional Tectonics in Collisional Orogens: A Case Study of Early Silurian Extension in the Central Appalachians Associated With the Taconic Orogeny
Forest Walker (Ph.D.)	Kinetics of Arsenopyrite Oxidative Dissolution by Oxygen
Adam Wallace (Ph.D.)	Biomolecular Controls on Silicification Processes
Dylan Ward (M.S.)	Testing the Roles of Climate, Tectonics, and Bedrock Lithology in the Late Cenozoic Incision History of the New River
Brad White (M.S.)	Using Time Domain Reflectometry and Surface Electrical Resistivity Methods to Investigate the Temporal and Spatial Occurrence of Groundwater Recharge in the Blue Ridge Physiographic Province
Nick Wigginton (Ph.D.)	Experimental Evolution: Examining Freeze/Thaw Cycle Viability of E. Coli After 20,000 Generations

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Geosciences Faculty Involved in The DUSEL Project at Kimballton, SW Virginia

By Bill Henika and Robert Tracy

Since the Fall of 2003, several Geosciences faculty have been working with members of the Departments of Physics, Civil and Environmental Engineering, and Mining and Minerals Engineering to develop a proposal for a Deep Underground Science and Engineering Laboratory (DUSEL) at the Chemical Lime Company's Kimballton mine in nearby Giles County. The project is being led by Professors Bruce Vogelaar of Physics, Matthew Mauldon of CEE and Bob Bodnar of Geosciences. The Geosciences team includes hydro-geology professor Tom Burbey, structural geologist Rick Law, regional geologist Bill Henika, seismologist Martin Chapman, and geophysicists John Hole and Matthias Imhof. The team has focused on developing science experiments as well as a viable geologic model of the area beneath Butt Mountain that was first mapped in detail by William Ekroade for his 1962 M.S. thesis under Professor Byron Cooper.

Virginia Tech Physics professor Bruce Vogelaar initially conceived a deep neutrino physics experiment (the LENS project) in the Kimballton mine. It began as a proposal to the National Science Foundation for the NUSEL project (National Underground Science and Engineering Laboratory) (*http://www.phys.vt.edu/~kimballton*).

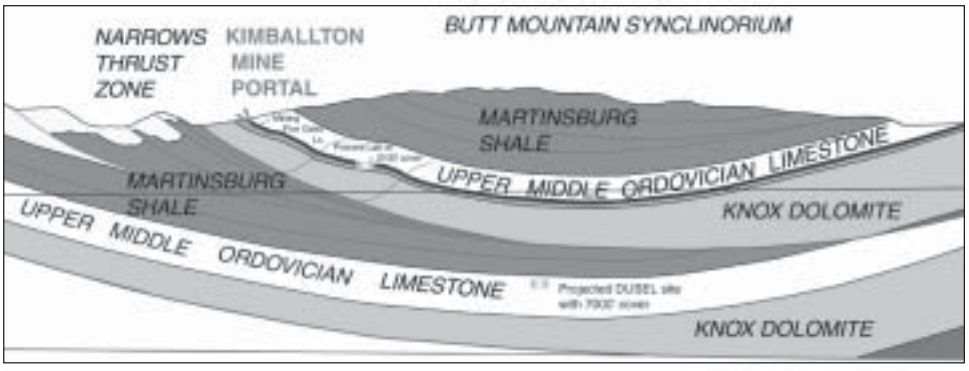
In preparing the geological model for this NSF proposal the team has been revisiting 60 years of geological and geophysical research by Virginia Tech faculty and students. Surface and subsurface mapping by Thomas Gathright II, William Ekroede, Art Schultz, Chuck Stanley, Robert McDowell, and Jerry Bartholomew have proven invaluable in fleshing out Cooper's original stratigraphic studies of the Middle Ordovician limestone formations in the New River- Roanoke River District published in Virginia Geological Survey Bulletin 62, in 1944. Geophysical data gathered and processed by graduate student W.J. Domoracki and Professors Costain and Çoruh during the late 70s and early 80s has been useful in understanding the regional structure.

The working model for the mine area is that of a major anticline syncline pair, including the Bane Dome and Butt Mountain Syclinorium, regional structures that were produced by subsurface imbrication beneath the Saint Clair and Narrows thrust faults that crop out along Allegheny ridges west of the mine. Former SOHIO /BP Appalachian Basin Industrial Associate and recently retired Virginia Divison of Mineral resources geologist Bill Henika has been providing regional geology expertise to the team as a retirement occupation. The geosciences team is working closely with Virginia Tech Geotechnical and Civil Engineering Professors Jimmy Martin, Matthew Maulden, Marte Gutierrez and Joseph Dove and Radford Engineering Geosciences professor Skip Watts. The cross sections and geologic maps are being digitized in the Environmental Engineering Department's GIS laboratory by Jason Shelton, a former Engineering Geosciences student from Radford. Digital conversion of cross sections will enable Jason to create an interactive three dimensional model to help guide seismic, drilling and geotechnical exploration.

The project will include research on the hydrogeologic implications of major fracture systems in the carbonate rocks along the Narrows thrust, precise seismic imaging of deep structures beneath Butt Mountain, strength of rock materials in deep mine cuts, ground control and biogeochemistry of deep groundwaters encountered in the lower levels of the mine (which is producing high-calcium limestone from a nearly 100 foot section of the Five Oaks Limestone on the western limb of the Butt Mountain Synclinorium). Physics experiments in the mine currently are shielded from cosmic and background radiation by nearly 2100 feet of bedrock. Part of the Geosciences team effort will be to explore the feasibility of tunneling deeper (to roughly 7000 feet below surface) for additional physics and geoscience experiments. This multi-million dollar DUSEL facility is currently the focus of intense competition among several potential sites, including the Homestake mine in South Dakota and the Soudan mine in Minnesota.

Entrance to Kimballton Mine

On March 29, 2004, the NSF held an information meeting at its headquarters in Arlington, VA, to outline the process for selecting a site for DUSEL. NSF announced that a solicitation to identify the science that could be accomplished in an underground laboratory would be released in early May, to be followed shortly by a second solicitation to identify 1-5 sites for further detailed study. Final site selection would occur in 2005. Representatives from Virginia Tech are currently in negotiation with the owners of the Kimballton Mine to arrange a suitable agreement for development of DUSEL at Kimballton.



VTX, continued from page 1

three long and hard days collecting and analyzing diffraction data from their own crystals. Some participants left with publication-quality results, which we considered quite an impressive achievement for undergraduate students who had never done crystallography before. Not only was the workshop an excellent educational opportunity for the participants, but we hope that it will become a powerful recruiting tool to attract highly-motivated undergraduate chemists into the Earth Sciences. We will therefore continue to host and run the workshop each summer of each year for students and faculty from regional undergraduate institutions; indeed, the demand for places means that we are planning on two workshops in 2004!

The inter-disciplinary nature of crystallography was recognized in January by the promotion of Professor Nancy Ross to the post of Associate Dean for Research for the College of Science. Her role as Associate Dean is to coordinate research activities within the college, find new opportunities for funding faculty research, represent the research aspects of the College at both University and national levels, and manage research, graduate and outreach administration within the college. Professor Ross will maintain her ties with the Department of Geosciences by continuing to teach the undergraduate mineralogy course, and by continuing to supervise research students and her post-doc, Dr. Jing Zhao, in the Crystallography Laboratory.

The lab also gained two further post-doctoral associates this year. Another Nancy, Dr. Nancy Vogelaar, joined us in September to run the new protein diffractometer. Nancy received her B.S. in chemistry at the University of Delaware and her Ph.D. in biophysical chemistry from Caltech. There she investigated the phase behavior of lipid systems and the topology of membrane proteins through both experimentation and computer modeling. During her post-doctoral position at Princeton, she studied the structure of the profilin-actin complex using X-ray crystallography. In addition to offering a "structure service" for proteins to the University she will continue to pursue a diverse array of research interests ranging from crystal nucleation, protein expression, and the energetics of protein folding and conformational changes through to the techniques of X-ray structure solution. We hope that Nancy's appointment will also enable us to support various departmental research programs addressing important environmental issues at the interface between mineralogy and biology.

Dr. Mario Koch spent six months with us funded by the Deutsches Akademisches Austauschdienst, the exchange program run by the government of Germany to send young German scientists abroad to gain research experience and promote cultural exchange. The alumino-silicate minerals sillimanite, kyanite and andalusite and the transformations between them could be said to be the cornerstone of metamorphic petrology; which one is found in a rock immediately constrains the pressures and temperatures to which the rock was exposed. Indeed, the Al_2SiO_5 phase diagram is usually the first that undergraduate geologists meet in their studies. So, it came as some surprise to us to discover that the equations of state (or how the volume varies with pressure) for these three common minerals were unknown. Mario's project was to determine their equations of state by measuring the volumes of crystals of each of these minerals by X-ray diffraction, using our diamond-anvil cells to apply pressure to the samples. The results will provide a sound basis for the thermodynamic calculations of phase equilibria not only between the Al_2SiO_5 polymorphs but also their reactions with other minerals.

For more information about the current activities in the Crystallography Laboratory, please come and visit us in 3076 Derring Hall whenever you are in Blacksburg, or on the web at *http://www.crystal.vt.edu/crystal/*.

The students and VTX staff of the 2003 summer crystallography workshop enjoying a short lunchtime break in the sunshine on the deck of Derring Hall

High-Resolution Chemical Dating of Monazite by Electron Microprobe: A Powerful New Tectonic Tool

by Robert J. Tracy
Professor of Geosciences

We are all aware that rocks and minerals can be dated using the radioisotopes of U, Th and Pb measured in traditional Thermal Ionization Mass Spectrometry (TIMS) of physically separated and dissolved mineral grains (e.g., zircon) or in newer methods such as Secondary Ion Mass Spectrometry (SIMS), also called Ion Probe, or Laser-Ablation Mass Spectrometry (LA-ICPMS). In these latter methods, atoms are sputtered from 20 to 100 micrometer areas in situ in rocks using focused ion beams or high-powered lasers, then passed through mass spectrometers to produce isotopic ratios. Over the last 50+ years, these methods have resulted in major contributions to our understanding of the evolution of orogens world-wide, including the Appalachians, and characterization of the earth's oldest known rocks over 4 billion years (4 Ga) in age. However, both TIMS and SIMS are time-consuming and costly analytical techniques that involve the limitations of tricky sample preparation, poor spatial resolution, and analytical complexity. Because minerals used in isotopic dating (e.g., zircon, monazite, sphene) may be complexly zoned both in chemistry and age on a micrometer or nanometer scale, the spatial-resolution limitation means that measured ages may in fact be averages of two or more zones grown at different times and separated by tens or even hundreds of millions of years in age. Isotopic ages from bulk techniques like TIMS (or even SIMS for finely zoned grains) may thus be hybridized, or volumetrically weighted, averages of the age zones present in mineral grains.

This note describes ongoing research at Virginia Tech in a radical new technique that uses electron microprobe (EMP) analysis of the mineral monazite, nominally $CePO_4$ but which also contains relatively high concentrations of Light Rare Earth Elements (LREEs), Thorium and Uranium. Monazite is a very common accessory mineral in many rocks, particularly those enriched in potassium and aluminum (e.g. granites, gneisses and mica schists), although it typically occurs in very low abundances and in small grains due to the low abundances of its constituent elements in most rocks. The electron microprobe yields chemical analyses of very small spots (about 2 micrometers across) in monazite, producing a greatly improved spatial resolution relative to most isotopic techniques.

But why can we use non-isotopic (chemical) analyses of the mineral monazite to do this new form of geochronology? The primary reason involves the geochemistry of monazite. Its tendency to incorporate significant concentrations of radioactive thorium and uranium means that measurable lead may be produced as a daughter element. Lead occurs naturally as a mixture of four stable isotopes (^{204}Pb, ^{206}Pb, ^{207}Pb, and ^{208}Pb). The isotopes ^{206}Pb, ^{207}Pb, and ^{208}Pb are the end products of the ^{238}U, ^{235}U, and ^{232}Th radioactive decay series, respectively. Each of these lead isotopes serves as a measure of the radioactive decay of the parent isotopes, and together with measurement of parent isotope concentrations may serve as a chronometer that yields the age of a mineral. ^{204}Pb is non-radiogenic (not produced by radioactive decay) and is the only isotope of lead that has no radioactive precursor; it is thus "original," "common," or "primordial." Many uranium- and thorium-bearing minerals incorporate common lead into their structures at the time of their formation, and this behavior requires isotopic determination by mass spectrometry of the "common" lead, the lead isotopes produced by radioactive decay, and the uranium isotopic parents. However, due to both ionic charge and size, lead (common or radiogenic) does not fit into the ionic sites of the monazite crystal lattice when it crystallizes and is thus efficiently excluded, so all of the lead that is found in monazite must be from the *in situ* decay of U (235 and 238) and Th (232) that has occurred since the mineral crystallized. Therefore we may be able to avoid isotopic analysis of lead to determine how much common lead is present.

However, we still have the problem of presence of two radiogenic lead isotopes (206 and 207) resulting from radio-active decay of the two uranium isotopes (238 and 235). These two most abundant isotopes of naturally occurring uranium constitute virtually all of the uranium in nature, and fortunately their ratio is very constant in rocks (^{238}U = 99.3% and ^{235}U = 0.7%). We may thus safely assume that the amount of total lead measured with the microprobe depends upon the initial amounts of the two radioactive uranium isotopes (in a fixed ratio of 99.3:0.7), the initial amount of ^{232}Th, and the time since the monazite initially crystallized during either initial magmatic or metamorphic crystallization (or metamorphic recrystallization). This allows us to use a very simple version of the radioactive decay equation to calculate how much time has passed since the monazite crystallized (or recrystallized). No isotopic data is required either for Pb or U, and this technique is therefore referred to as "chemical dating" to distinguish it from the more traditional isotopic dating.

A second advantage of monazite as a geochronometer derives from its behavior during metamorphism. It initially appears during prograde metamorphism, like the classic metamorphic minerals garnet, staurolite, and kyanite. Once it has formed, the "clock" starts and the radiogenic lead accumulates atom by atom as time passes. (In igneous rocks, the initiation of the process is the crystallization of the magma.) If the monazite remains unperturbed, lead may build up to very substantial levels given sufficient time: Archean monazites older than 3 Ga from Montana that have been analyzed in the Virginia Tech lab have yielded lead concentrations over 13,000 parts per million. However, most Paleozoic monazites typically contain only 300 to 1200 ppm Pb unless the monazites are unusually rich in Th and U. Most importantly, monazite has a tendency to undergo partial recrystallization during later thermal events, particularly in the presence of inter-granular hydrothermal aqueous fluid. When monazite recrystallizes, it incorporates all of the

original constituents, including remaining radioactive thorium and uranium, but *excluding* any accumulated lead, which may then dissolve into inter-granular aqueous fluid (if present in small concentrations) or form new daughter minerals such as PbS (galena) or PbO (massicot), if sufficiently abundant. The clock thus starts anew in the recrystallized monazite in the new age zone, which may form along the rim of the original grain or along a crack or fracture. Many monazites analyzed in the VT lab show as many as four separate age zones that can be discriminated by microprobe analyses (Figure 1). Monazite may thus act as a chronologic "tape recorder" that preserves evidence

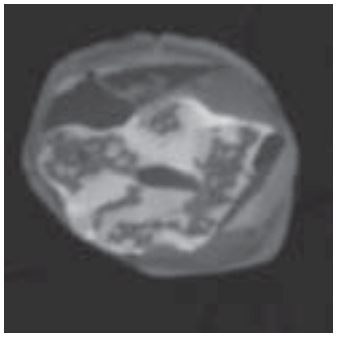


Figure 1. Chemical map of Yttrium zonation in monazite from Massachusetts (120 microns across). This monazite yielded three distinct age zones of 435 Ma, 400 ma and 360 Ma.

of the thermal events that have occurred during tectonic/orogenic evolution of the rock.

As an example of dating a monazite crystal, suppose we have used the microprobe to measure 25,862 ppm Th, 11,137 ppm total U, and 1,185 ppm total Pb. The decay constants are ë = 4.95×10^{-11}, ë = 9.85×10^{-10}, and ë = 1.55×10^{-10} for ^{232}Th, ^{235}U, and ^{238}U, respectively. Knowing these decay constants, the measured amount of total U and ^{232}Th, and assuming the constant relative proportions of the two uranium isotopes, we can now calculate the amount of total Pb that we should get from radioactive decay starting at time *t* in the past. We then compare this calculated amount with the amount of total lead that we actually have measured now in the monazite. By adjusting the time *t* until the calculated amount of Pb is equal to the measured amount, we arrive at a calculated age of the crystal (or portion of it) that was analyzed. In the above example, the total lead calculated at 426.5 Ma is 495 (from total U decay) + 690 (from Th decay) = 1185 ppm, which agrees with the measured amount. The calculations are easily done using an Excel spreadsheet with programmed cells.

Analysis of trace amounts of elements with the microprobe is a non-trivial exercise and special analytical protocols must be adopted, including elevated beam energy and lengthy analytical times compared to normal microprobe analysis. The typical individual analysis takes from 20 to 30 minutes, so productivity is generally less than 50 analyses per 24-hour day. There are the usual analytical errors associated with the measurement of Th, U and Pb using the microprobe, and larger errors are associated with measurement of very low concentrations of Pb, but sufficiently large datasets (50 to 100 analyses) produce statistically significant mean ages with an uncertainty of about 5 Ma (at 95% confidence), comparable to most isotopic age determinations. The most common limitation to age determination with this technique is based on very low concentrations of lead (less than about 300 ppm) that approach the limit of detection with the microprobe. This typically translates to an effective lower limit of age resolution of about 200 Ma for most monazites, except for those anomalously rich in Thorium and Uranium. Very few microprobe laboratories in the U.S. are currently capable of routine monazite analysis for age determination, and by far the two most productive at this time are at Virginia Tech and the University of Massachusetts.

Mountain belts are commonly characterized by multiple thermal events or thermal pulses separated by tens or hundreds of millions of years, each of which may result in growth of a new set of metamorphic minerals (these new mineral assemblages at lower grade are typically characterized as *retrograde metamorphism*). Understanding the age relations of such thermo-tectonic events is key to understanding the evolution of mountain belts, but ages of these events have previously been very difficult to characterize accurately using isotopic techniques, which have most commonly been applied to determining crystallization ages of igneous rocks. This new microprobe technique for monazite dating is the first truly dependable and easily applicable analytical method for precise dating of thermal (metamorphic) events in mountain belts, and thus is developing into an essential tool for tectonic reconstruction of Paleozoic and Precambrian metamorphic terranes.

At Virginia Tech, we have so far investigated the thermochronology (age relationships of thermal events) of metamorphic rocks from New England (New York, Massachusetts, Vermont, Connecticut), Virginia, North Carolina, Colorado, and Wyoming. Much of the research has involved straightforward characterization of the ages of metamorphic events in orogenic terranes, and some results have involved surprises. For example, in dating regional metamorphism of the Smith River Allochthon in Virginia - a terrane of the Eastern Blue Ridge or Inner Piedmont that includes the towns of Martinsville, Stuart and Altavista, including the famous "fairy-stone" localities of twinned staurolite - that was thought to have been metamorphosed in the Taconic Orogeny (about 480 Ma), we found lots of evidence in monazite of an earlier metamorphic event at 535-540 Ma (early Cambrian). This is a very atypical Appalachian age and has since been interpreted as indicating that the Smith River terrane was once on the western margin of Gonwana and had a prehistory before its accretion to North America in the Taconic. In addition to characterization of regional metamorphic ages, this new monazite technique has proved to be of special value in dating short-duration events such as shear-zone formation and contact metamorphism.

The Virginia Tech microprobe lab is rapidly becoming a recognized national center for monazite microprobe age-dating, and several guest investigators from other universities (Kent State, Ohio University, University of Kentucky and University of North Carolina) have visited over the past year.

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ALUMNI NEWS

'49

George B. Vockroth (B.S. '49) writes "Enjoyed your field trip article in the newsletter. My first field trip on arriving at Tech was with Dr. Holden. This was a month or so before he died. We went to Lusters Gate to collect graptolites. Now I know what I collected. I am so glad the Geology Club is active. I was the first president."

'60

William A. Thomas (Ph.D. '60) is currently serving a one-year term as Vice President of the Geological Society of America. Bill is the James S. Hudnall Professor of Geology at the University of Kentucky. Bill's wife, Rachel, received her bachelors degree from VT in 1959. *geowat@uky.edu*

'82

Robert "Bob" Dischinger (B.S. '82) is the owner and president of Evans Engineering, Inc., a small (30 employee) civil engineering consulting firm. Bob obtained his Professional Engineer's License in 1993 and purchased the company from the founder in September 2003. Bob writes, "I am still happily married to Susan (20 years this past May!) and we have two great children – Ashley (16 in January) and Eric (14 in February). I would like to send a special "thank you" to Dr. Lowry. Without his constant encouragement, I may not have ever obtained my degree. Even though I did not end up in the oil business, that degree opened the door to where I am today and I am very grateful for his guidance. I would also like to know the status of Bill Mussman, Steve Walker and Kent Kane. Any news would be appreciated." *rsd@evans-eng.com*

Jim Niemann (B.S. '82; M.S. '84) is the Well Modeling Team Leader for ChevronTexaco in New Orleans, Louisiana. Jim writes: "I just moved into a beautiful home along the Mississippi River, just as ChevronTexaco moves to Houston! Stay tuned!" *jimniemann@chevrontexaco.com*

'85

John Grotzinger (Ph.D. '85) By now you have probably seen several news reports mentioning work by Dr. John Grotzinger '85 on the interpretation of geological data accumulated by the rovers on Mars. Mike Huggins '83 brought our attention to an article on MSNBC at *http://www.msnbc.msn.com/id/4110568/*. The article is an excellent description of John's background and thoughts on being a rover team member.

'87

Ed Simpson (Ph.D. '87) and **Wendy Simpson (B.S. '88)** write, "Ed has been appointed Interim Dean of Liberal Arts and Sciences at Kutztown University. He helped oversee the completion of a $22 million science building that houses chemistry, physics, biology, and geology. Wendy is currently on sabbatical from her earth science teaching position at Parkland High School. She traveled to Manchester, England in September to compete in the Master's World Track Cycling Championships where she earned 2 bronze medals in the 2 km. women's pursuit and the 500 m women's time trial. She is currently training for a World Cup qualifying race in Ft. Lauderdale, Florida in February and the Master's National Track Cycling Championships later this year in Colorado Springs. She races for Tri State Velo cycling team at the Lehigh Valley Velodrome.

Wendy in the medal round of the women's pursuit at the world championships

'90

Joel Daniel (B.S. '90) writes "The last two years or so I have been working at Draper Aden Associates in the Richmond, Virginia office (Headquarters is in Blacksburg, Virginia), as a hydrogeologist. I have also been an adjunct Physical Geology instructor at J. Sargeant Reynolds Community College for several semesters, and I have found that teaching really isn't all that bad! (But, teaching AND working full time is different). As for other geologic pursuits, I have made several geology-oriented trips to Washington state, including checking out volcanic and glaciated terrains around Mt. Baker, and most recently climbing Mt. Saint Helens. That is a truly amazing and humbling view! In 2001, I ventured solo up to Newfoundland to see, among other things, Gros Morne and Tablelands. It is also pretty humbling to be within an arm's reach of Moho rocks…and not be able to touch them. Needless to say, I have acquired quite a collection of rocks, which is somewhat of a nuisance when having to move. I reviewed the January, 2004 Geosciences newsletter, and it sounds like the department is doing quite well, especially beefing up its environmental geology capability. I think back to my days there, and just wish I was there now with the way the program is currently headed. Sometimes I get a distant urge to try and do a Ph.D., but who knows? Best regards to everyone!"

'94

Jeff VanDerHurst (B.S. '94; M.S. '96) received his second masters in geophysics from Texas A&M. He has worked for Anadarko for 3 years and has spent the last year and a half working in North Louisiana. He has

been busy working on a recently acquired 180 square mile 3D. Jeff and his wife, Lana, welcomed their first child, Sasha, on January 12, 2004. Sasha weighed 6 lbs. 8 oz, and was 20" long. Jeff writes "It is amazing how something so small can scream so loud! Jeff writes: It sounds like there have been a lot of changes in the department, enough to make ones head spin. I need to make it back to that corner of Virginia someday. Winters in Houston are, lets say, a little more mild. I used to love going over to the Duck Pond at night after a fresh snow…maybe some day. Until then, say "Hi" to Linda, Carolyn, Rick, and everybody else for me." Regards, Jeff. *Jeff_Vanderhurst @ anadarko.COM*

'96

Liza (Scango) Mandeville (B.S. '96) is a Test Engineer for Dell Inc. in Round Rock, Texas. *liza.mandeville@att.net*

Wendi Tibiletti (M.S. '96) "Hello to everyone in Blacksburg! I just wanted to give ya'll an update of the latest going's on. I have moved on from Unocal and am now currently working as an Exploration Geophysicist and am having a wonderful time prospecting in the Sacramento Basin, the Anadarko Basin, and all over Texas. Working for a company this size suits my personality and is a breath of fresh air because we actually focus on finding oil and gas using the latest technology. I have the best of both worlds — working with a great group of people where my input sees immediate results and where we have the technology that is usually reserved for the majors.

Other than the job, my little boy, Gabriel, is now 3 ½ and growing like a weed. He keeps Max and me very busy because he's just like his Mamma – can't sit still. He has been the biggest joy of my life and seeing the world through his eyes has been the greatest adventure.

We hope to get to Blacksburg sometime and drop in to say hello!" *wtibiletti@opex.cc*

'98

Brian Eisert (B.S. '98) writes: "I am the technical lead on a contract with the consular systems division (consular affairs) at the U.S. State Department. I married Kimberly Reyes on February 2, 2000 and we have a beautiful 3 ½ year old girl named Karlina." http://groups.msn.com/K2rlin2) *bmeisert@hotmail.com*

'03

Chelsea McRaven (B.S. '03) started working in the Geo/Hydro Unit of the Oregon Department of Transportation in Bend, Oregon on February 23, 2004. She is working as an entry-level trainee under a Geotechnical Engineer and a woman geologist. Chelsea writes, "This job has so much potential for advancement and is a great step up and foot in the door for my professional career…and a good step towards figuring out what I want to do in grad school! I will be learning so much and I will be doing a lot of field work in groundwater hydrology, geological surveying, geotechnical analyses, 3D modeling and lots more!" Congratulations, Chelsea, on your new job!

Obituaries

James Edward Hackett, 81, of Blacksburg, died Thursday, November 6, 2003, in Lafayette, Louisiana. Dr. Hacket retired from V.P.I. & S.U. as a Geology Professor after serving over 20 years.

John A. Pritchard - It is with great sadness that Robert T. Pritchard, Geology '63, announces the death of his brother, John A. Pritchard, on January 4, 2004. John graduated from Virginia Tech with a degree in geophysics in 1964.

Note from the Editor: We had the pleasure of meeting John again in the setting of our Alumni/Faculty dinner meetings a few years ago. We will miss him.
Lynn Glover III, '52

Charter for Houston Area Virginia Tech Geosciences Support Group

Purpose: The Houston Area Virginia Tech Geosciences Support Group (HAVTGSG) is formed to complement the Alumni Relations Committee (ARC). HAVTGSG is expected to work closely with ARC on a more local level in support of the Department of Geosciences at Virginia Tech.

Expectations: The primary goal of HAVTGSG is to provide an important communications link between Houston area Virginia Tech Geosciences alumni and the Department in Blacksburg to support and promote the image and visibility of the Geosciences Department at Virginia Tech. The group will facilitate a cooperative and coordinated effort to support the Department locally. A few expectations are listed below:

1. Coordinating potential data or hardware contributions for the University within individual companies, by companies banding together, or by companies jointly working with contractors, service companies, or consortia.
2. Fostering an interest in recruiting or possible funding of the Department by more companies working through Virginia Tech graduates at those companies. With every merger there are obviously fewer potential companies to interview at Virginia Tech. And with every round of layoffs, more connections to the history of the geosciences at Virginia Tech are lost in the industry. This effort could increase industrial companies interested in and awareness of Virginia Tech and at the same time increase employment opportunities for graduates of the Department.
3. Helping the Department collect updated information on students that have graduated and entered industry or other occupations. Local Virginia Tech alumni can then use this departmental information as a statistical database to support recruiting efforts within their company.
4. Starting an organized Houston office “site visit” program where Virginia Tech faculty/students when in Houston for conventions/conferences/meetings can visit industry/company offices. Students will be introduced to people, projects, technology, and office environments, and companies will be introduced to the students. This is an easy win/win opportunity for Virginia Tech and for companies which overcomes the geographical distance between Houston and Blacksburg in a cost-effective manner. (It was an extremely successful program at Texaco several years ago that eventually evolved into a similar effort with six schools.)
5. Providing a job network for Houston Hokies predominantly in the oil industry. There are Virginia Tech alumni employed at numerous E&P and service companies around Houston, some in very important positions within those companies. As industry continues to decrease in size, networking is an extremely important means of continued employment. With over one hundred Geosciences alumni in the Houston area, there is a tremendous networking opportunity for our graduates, which is not being fully utilized.

Organization: A coordinator and a number of individuals selected by the coordinator to help him/her will organize the efforts and activities of HAVTGSG. Mike Strickler (’83), as the founder of HAVTGSG is asked to be the first coordinator. There is no term-limit for the coordinator and others involved.

Key Contacts:

Coordinator: Mike Strickler (’83)
281-287-7513mike.strickler@unocal.com

Assistant: Wendi (Thompson) Tibiletti (’92 & ’96)
281-879-3571
WTibiletti@opex.cc

Assistant: Shelley Ellison Tyree (’98 & ’01)
713-432-6763
etyr@chevrontexaco.com

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TO DONORS

A message from Kylie Johnson: An Invitation to be Part of something Special…

As we prepare for a future in which the College of Science at Virginia Tech is a national leader in scholarship and the teaching of science, we are educating students and building knowledge for a world that is increasingly global, entrepreneurial and ever more reliant on technology and science. These times demand scientists who can push the boundaries, go beyond what is expected and engage in "out of the box" thinking to stay ahead of the constant change of today's world. The College of Science takes on the task of creating these leaders and encouraging their intellectual growth with a deep understanding of their importance in this rapidly changing world.

Virginia Tech's Department of Geosciences is known world-wide. Our faculty members are discovering cutting-edge technologies and creating innovative solutions. They are successfully collaborating, reaching across the disciplines and building partnerships with industry to produce results . . . results that impact society, improve lives and ultimately make the world a better place.

To accomplish our goals—to achieve Virginia Tech President Charles Steger's hope of becoming one of this nation's top research institutes and through that a top institute for graduate and undergraduate education—we need your support. Virginia Tech receives less than a third of its funding from the state of Virginia. To face the new challenges of today's global marketplace with increased competition for funds and students, we need you—business leaders, government officials, individual citizens, and alumni—to make a gift for our present and our future.

If you would like to consider making a gift to the Department of Geosciences currently there is financial need especially for undergraduate scholarships and fellowships including funding for field studies and research, graduate scholarships and fellowships, endowed chairs for faculty, laboratories for research and teaching including our Geosciences Museum.

We've made every effort to make giving to the Department of Geosciences easy. You may include a brief note stating how you would like your gift to be used. Please note that Cahit Çoruh, Chair of the Department of Geosciences would be happy to work with you to determine the best use of your gift. You may choose to contribute in any of the following ways:

- Write a check made payable to the Virginia Tech Foundation, Inc. and earmarked to Geosciences and mail it with the form below.
- Make your gift with your credit card by providing your information on the form below.
- Visit www.givingto.vt.edu and make a gift online using a secure website.
- Call toll-free at 1-866-401-9926 between 8 a.m. and 5 p.m. Eastern Time.
- We also accept gifts of appreciated stock or gifts made through electronic funds transfer. Please call us to make arrangements.

And don't forget that you may be able to double or triple your gift to VT through your employer's matching gift program! Whatever you do, please give. Your gift truly does make an impact.

The Department of Geosciences will use these funds for graduate student fellowships, undergraduate scholarships, and various program initiatives. We are also seeking special funds to start a new Geosciences building and to establish chaired faculty positions. For information about estate planning, special gifts, or anything else, please contact Dr. Kylie Johnson, Direction of Development for the College of Science at 1-866-401-9926 or 540 231 2551 or kyliej@vt.edu. Thank you for your support.

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