

Volume 93 Number 4
Fall 2003

MINES



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Dazzles, Delights** page 6
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in Energy** ∞ page 16

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"A Friend to Lean On"

**MINES
FALL 2003**

Mines is published quarterly by the Colorado School of Mines and the CSM Alumni Association for alumni and friends of the School. The magazine is a merger of *Mines Magazine* (founded in 1910) and *Mines Today* (founded in 1986). The merger took place in 2000.

Comments and suggestions are welcome. Contact us by writing to MINES, P.O. Box 1410, Golden, CO 80402; or call 303-273-3294 or 800-446-9488, ext. 3294, between 8 a.m. and 5 p.m., M-F MST; or email magazine@mines.edu.

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Letters to the Editor



Networking Pays Off

I would like to thank you for printing the alumni directory (Network 2002). During my recent job hunt I decided to look for job opportunities in the directory and wound up being hired by another Mines graduate!

Vanessa Davies-Pappas BSc Math & Comp Sci '99, MSc Math & Comp Sci '01

[Editor's note: Active members of CSMAA can view the directory on line. The on-line version is updated constantly throughout the year.]

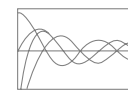
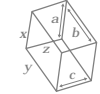
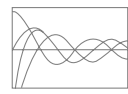
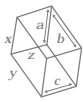
More on Mines' Military History

As a former professor of Military Science at Mines, I read Lorraine Wagenbach's article "The Glory Years of ROTC" (*Mines*, Fall 2002) with a bit of disappointment for it said nothing about Army ROTC in later years. For example, in 1983 and 1984 Mines led the nation in the number of students who won Army ROTC scholarships! But this wasn't an easy accomplishment.

Although Ms. Wagenbach proudly pointed out that in 1971 Mines commissioned 64 engineers as second lieutenants, the nadir of the program followed just nine years later when enrollment in the advanced course fell off drastically, and the Mines Army ROTC program was placed on probation and faced extinction. The reasons for this are many: the anti-war backlash of the Vietnam War, the "national malaise" pointed out by President Carter, and the Department of the Army decision to discontinue "Branch Material" programs like Mines', which guaranteed Mines students commissions in the Army Corps of Engineers.

It was only through hard work and the support of many Mines faculty members and former grads that the Mines cadre, led by an energetic enrollment officer named Maj. (later lieutenant colonel) Bruce Goetz, was able to turn the tide, and Mines led the nation (in Army ROTC) once again in 1983 and 1984. Since then, Mines graduates have served with distinction in Operations Desert Storm, Enduring Freedom, Bosnia, Kosovo, and I am sure Iraqi Freedom!

Rick Anderschat
Colonel, U.S. Army Corps of Engineers, Retired
Professor of Military Science, 1983-1985



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New Geology Museum Dazzles, Delights
Geology museum moves to new home
in General Research Laboratory

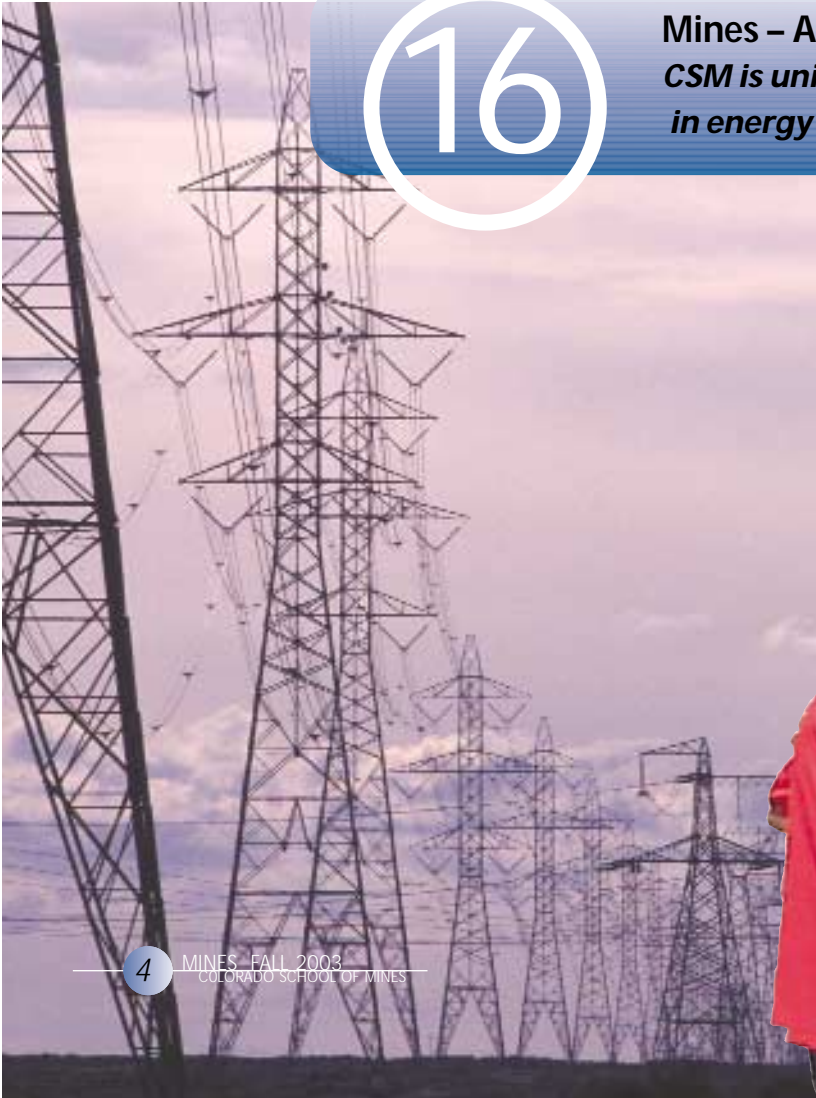
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Mines – A Leader in Energy
CSM is uniquely qualified to play a prominent role
in energy issues



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About Our Cover:

The Ponnequin Wind Farm, located south of Cheyenne, Wyo., near the Colorado-Wyoming border, provides the first commercially produced electricity from wind power in Colorado. The wind farm was one of many sites visited last summer by participants in CSM's Energy and Minerals Field Institute. Photo courtesy of Xcel Energy, Denver, Colo.



NEW GEOLOGY MUSEUM DAZZLES, DELIGHTS

By Marsha Konegni



CSM Board of Trustees President F. Steven Mooney Geol E '56, left, and CSM President John U. Trefny at museum's opening reception in September



Former CSM President Guy T. McBride Jr. examining a recent donation to the new museum



Museum Director and Curator Paul Bartos, left, and Vice President of Academic Affairs Nigel Middleton, right, with Bruce Oreck, who has donated mineral specimens worth \$1 million to the museum, including this clear quartz crystal surrounded by albite and tourmaline from the Pederneiras Mine in Brazil



Paul Bartos, left, and Martin Zinn, who has donated an entire special exhibit of Tennessee minerals to the museum

Dave Bunk, former Mines student, with his special exhibit of rhodochrosite from the Sunnyside Mine in Colorado



Bryan Lees BSc Geol '85 and Kathryn Lees BSc Math '88 beside the world's best collection of rhodochrosite specimens, which they have loaned to the museum; the rhodochrosite, Colorado's state mineral, is from the Sweet Home Mine in Colorado.



The official ribbon-cutting by Dr. and Mrs. John U. Trefny



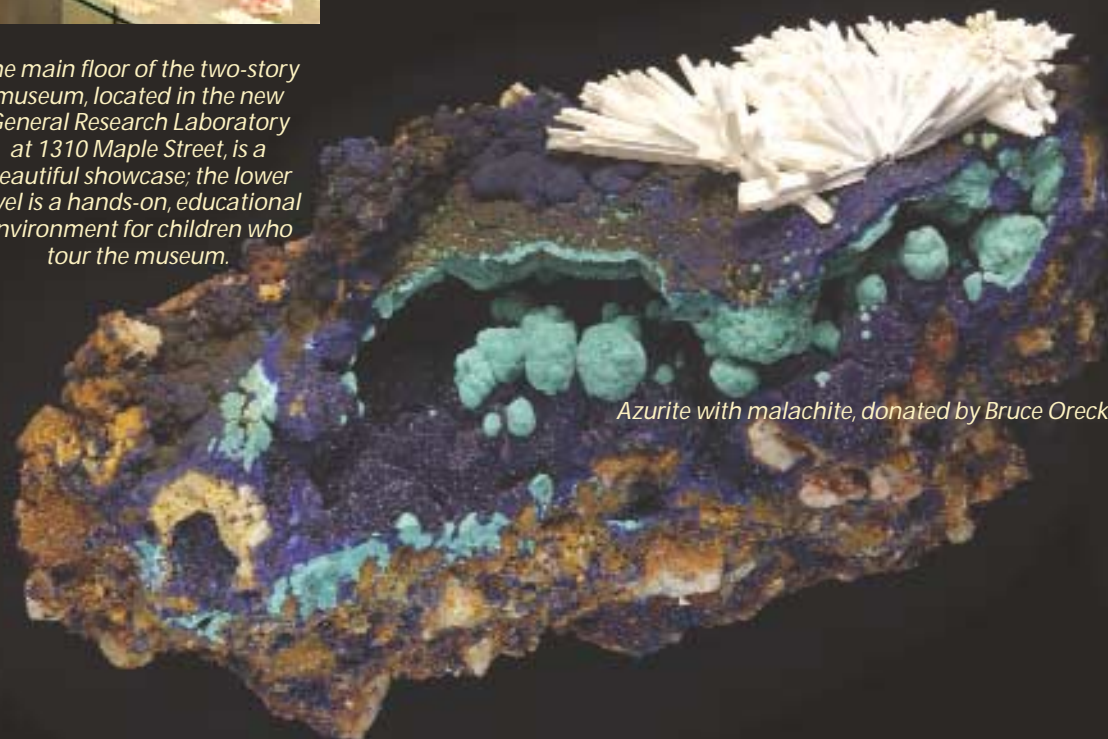
Gold from the Smuggler Union Mine, Telluride, Colo.



Calcite from the Elmwood Mine, Carthage, Tenn., on loan from Martin Zinn



The main floor of the two-story museum, located in the new General Research Laboratory at 1310 Maple Street, is a beautiful showcase; the lower level is a hands-on, educational environment for children who tour the museum.



Azurite with malachite, donated by Bruce Oreck



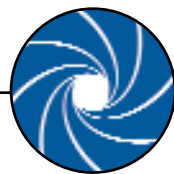
Malachite with azurite from the Copper Queen Mine, Cochise County, Ariz.

Mines' Newest Building

The General Research Laboratory (GRL), Mine's newest building, celebrated its opening with a reception in September. Building occupants include the Center for Commercial Applications of Combustion in Space, the Geology Museum and the Ultrafast Optical Science Laboratory. GRL is located at 1310 Maple Street.



General Research Laboratory (GRL) officially opened in September



Under Secretary of Energy Visits Mines

Robert G. Card, the U.S. Department of Energy's Under Secretary of Energy, visited Mines in July to become better acquainted with the School's energy research program. He met with Vice President of Academic Affairs Nigel Middleton, as well as John Curtis, John Fanchi, David Olson and Tony Dean. The meeting focused primarily on natural gas potentials in the Rocky Mountain region, with supplementary discussion on oil and gas production, nuclear energy and surrogate nuclear materials, and fuel cell technologies.



CSM's Nigel Middleton with Under Secretary of Energy Bob Card

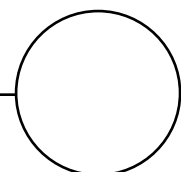
MicroPhage Inc.

MicroPhage Inc. has won "The Next Great Idea: TiE-Rockies' Search for Tomorrow's Technology Business," a region-wide competition to identify and help develop the best new technology business concepts in the Rocky Mountains. All submitted business plans were evaluated

by leading Colorado business executives and venture capitalists. TiE, founded in 1992 in Silicon

Valley, Calif., is a not-for-profit global network of entrepreneurs and professionals. Mines has partnered with MicroPhage Inc. to commercialize technology developed in the Department of Chemistry and Geochemistry. **Angelo Madonna PhD Applied Chem '02** and Kent Voorhees invented the technology that allows for identification of microorganisms in such applications as bioterrorism incidents, environmental monitoring, food safety and emergency epidemics.

SHORT STAKES

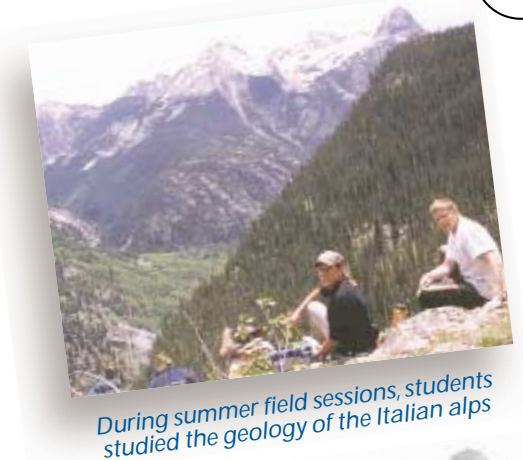


Michael Mooney

Mooney Honored

Dr. Michael Mooney, associate professor in the Division of Engineering, has received the 2003 Arthur Casagrande Professional Development Award from the American Society of Civil Engineers. The award recognizes outstanding accomplishments as evidenced by completed works, reports or papers in the field of geotechnical engineering. Mooney was honored for his contributions to geotechnical health monitoring, intelligent geosystems and geotechnical education.

Mooney's research involves the development of intelligent geoen지니어ing systems through sensing, automation and control. His research in intelligent geoconstruction and built infrastructure monitoring is funded by the National Science Foundation, the Federal Aviation Administration and Ingersoll-Rand Corporation.



During summer field sessions, students studied the geology of the Italian alps

The best students in science and math



Mines Medals to High School Juniors

A reception for Colorado high school juniors who won Mines Medals this year was held June 8. The students were chosen as the best in their schools in science and

mathematics. The awards, a joint program of the CSM Alumni Association and the Office of Financial Aid, include a \$1,000 scholarship for students who attend Mines.



...and of the Molas Lake area near Silverton, Colo.

CSM a "Pipeline" for Department of Energy

Mines is one of two schools chosen to act as a pipeline leading top-notch engineering graduates to careers in the Department of Energy's Office of Fossil Energy.

Chosen from among top engineering and earth science learning institutions across the nation, Mines and Penn State University will institute pilot programs to attract future employees to government positions in fossil energy. Approximately two-thirds of the Office of Fossil Energy staff are eligible to retire within the next four years.

Selected graduates will enter a technical career intern program with

government commitments to:

- provide extensive training in fossil energy technologies
- pay up to \$40,000 of student loans
- pay for a master's degree in earth sciences or engineering from one of the pipeline educational institutions, while working part-time and receiving full salary
- provide other standard benefits of employment with the federal government.

After an initial pilot program implementation period of up to 36 months, the program is expected to expand to include more colleges and universities ranked as superior in the engineering and earth sciences disciplines.



At a CSM Engineering Design Summer Camp, high school students invented propulsion systems to transport their teams in vessels across the School's swimming pool. No oars or paddles allowed!

CSM Discoveries Hailed by Physics Today

Of four noteworthy physics discoveries highlighted in the August 2003 issue of *Physics Today*, two originate from the CSM Physics Department.

One is the all-optical histology with femtosecond lasers, a technique for cutting and imaging brain tissue. Mines Professor **Jeffrey Squier BSc Phy '84, Msc Phy '86** is one of the researchers on the multidisciplinary, multi-institutional team that has developed the technique.

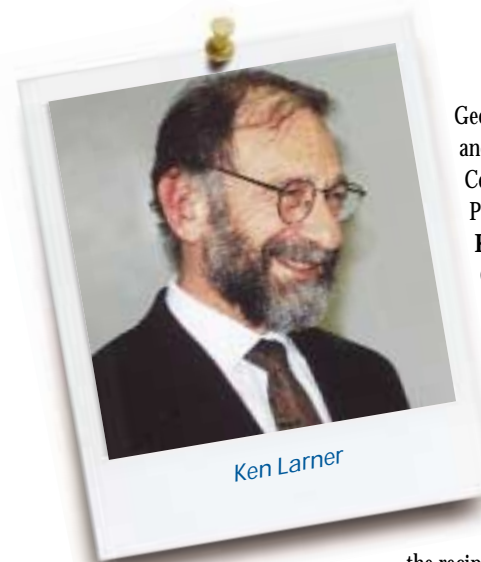
The other discovery is energy-filtered scanning tunneling

microscopy. This novel technique extends the concept of a color filter, long used to enhance contrast in optical microscopes, to imaging at the atomic scale. The team of Mines researchers around Physics Associate Professor Peter Sutter, which developed the technique, foresees far-reaching applications in nanotechnology.



Teresa Hall of Custodial Services was awarded the 2003 Mines Classified Employee of the Year Award at the classified staff recognition brunch held on campus in August. Pictured with her is Director of Human Resources Mike Dougherty.

SHORTS TAKES



Ken Lerner

Geophysics Professor and Director of the Center for Wave Phenomena
Kenneth Lerner Geop E '60 at the International Geophysical Conference and Exhibition Moscow in September. The award, named after

the recipient of the 1978 Nobel Prize in Physics, recognizes Lerner's contributions to geoscience, the theory and practice of seismic methods, and humanitarian activities.

Lerner Awarded Medal

The Russian Academy of Natural Sciences will present its highest award, the Piotr L. Kapitsa Gold Medal, to



New Athletics Hall of Fame inductees included John Lockridge Geol E '52 and his wife Erika, both outstanding boosters of Oredigger athletics.



Jodi and Raul Varela BSc Eng '96 attended the 8th Annual Athletics Hall of Fame Dinner in September, when Raul was inducted into the Class of 2003 Hall of Fame. Raul was the all-time leading scorer in the history of the Oredigger basketball program with 2,551 points.

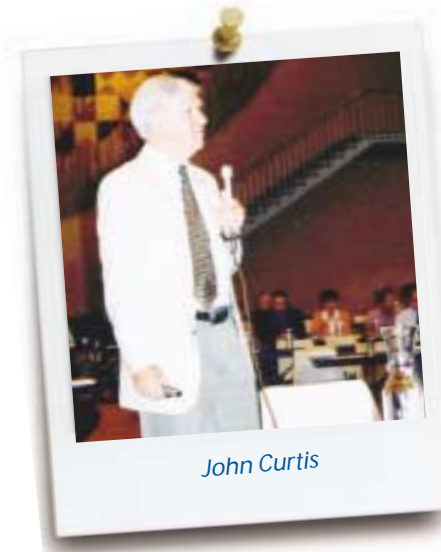
Unique Poster a Winner

A Mines poster entry won first prize in the category "Unique, Unusual, and New Techniques" at the 2003 International Metallographic Contest in San Antonio in August. Frederick Fraikor, director of CSM's Colorado Advanced Materials Institute, and Tim Casias, an undergraduate student in the George S. Ansell Department of Metallurgical and Materials Engineering, submitted the winning entry, "Scanning Electron Microscopy of Petrified Wood Archeological Artifacts." The poster was also one of five finalists for the Jacquet-Lucas Award for best in show.

The CSM research project associated with the poster is funded by the State Historical Fund with a team of faculty and student investigators including E. Craig Simmons, Chemistry and Geochemistry; Hans Joachim Kleebe, Materials Science; Andrea Elliott, Chemistry and Geochemistry student; Helen Kearney, Materials Science graduate student; and Mark Eberhart, Chemistry and Geochemistry.



In July a film crew used the Mines campus as its location for the taping of a television commercial.



John Curtis

U.S. Task Force Hears Testimony

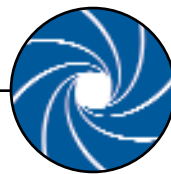
A meeting of the U.S. House Speaker's Task Force for Affordable Natural Gas was



U.S. House Speaker's Task Force holds meeting at Mines

held on the Mines campus in August. Rep. Bob Beauprez of Colorado, with Rep. Barbara Cubin of Wyoming and Rep. C.L. "Butch" Otter of Idaho, heard testimony

from a number of witnesses, including Mines Associate Professor John Curtis, who is director of the Potential Gas Agency.



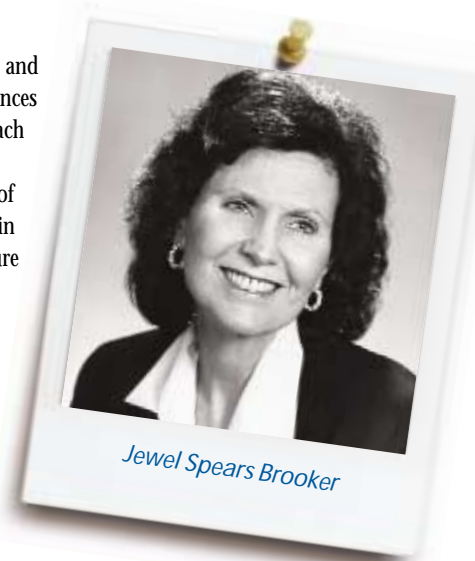
Ground was broken in September for three sorority houses, Sigma Kappa, Pi Beta Phi and Alpha Phi.

Taylor Named Speaker

Patrick Taylor BSc Met '74, BSc Math '74, PhD Met '78, George S. Ansell Chair Distinguished Professor of Chemical Metallurgy, has been invited to speak at the 2004 Extraction & Processing Division Luncheon at the 133rd Annual Meeting & Exhibition of The Minerals, Metals & Materials Society in Charlotte, N.C., in March. His presentation will be titled "Extractive Metallurgy Today and Tomorrow—An Academic's Perspective."

Brooker Discusses Violence, Imagination and Literature

The Division of Liberal Arts and International Studies announces that the 2003-2004 Hennebach Visiting Professor is Jewel Spears Brooker, a professor of literature at Eckerd College in St. Petersburg, Fla. Her lecture series—open to all CSM students, staff, faculty and the public—is titled "Violence, Imagination, and Modern Literature."



Jewel Spears Brooker

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Central

Chicago

August 1, a group of Miners, friends and family got together for a Cubs game in Wrigley Stadium. Afterward, the group partied at the home of **Jeff Babcock Met E '65**.



Missouri

Several Mines alumni turned out to watch the Orediggers football team beat University of Missouri at Rolla.



Clockwise from foreground is Kent Peaslee BSc Met '78, Jay Mallery BSc Min '83, Rosanna Ridings, Roger Phillips Geol E '63, Andy Olson BSc Geol '99, son Bryce Olson, Angela Olson BSc Eng '00, Cheryl Ray, son Derrick Ray, son Daniel Ray, David Ray BSc Eng '91, Dan Applegate.

Gulf Coast

Houston

Houston Happy Hour: From left, **Louise Jacobsen BSc Pet '00**, Meghan Quiat (current student), and **Laura Westler BSc CPR '00** enjoyed getting together for happy hour June 26.



The Houston section toured the Saint Arnold Brewing Company in mid-July. Standing left to right: Jairo Cadena (guest, Texas A&M grad), **Nicolas Lacouture BSc Min '88**,



Laura Westler BSc CPR '00, Will Westler BSc Pet '00, Kathy Roldan BSc Geop '88, Kelly Brown BSc Pet '93 and son Deklan, Sara Brown BSc CPR '93, Julie White BSc CPR '93. Front row, Susie and Jon Kepler BSc Eng '01.



Gulf Coast

Dallas → Twenty alumni and friends attended a get-together of the Dallas section in June. Seated around the table starting at left, Gulshan Amlani, Jack Parkin Geop E '53, Nancy Alexander BSc Math '76, Will Culp BSc CPR '99, Diane Brownlee BSc CPR '75, Kevin Janowski BSc Chem Eng '02, Les Crum MSc Min Ec '80, John Gorman MSc Env Sc '92, Elizabeth Gorman, Tim Saenger BSc Phy '95, Azy Madani BSc Chem Eng '01, Scott Darling BSc Pet '87, Chip Hodge (on the stool), Kathy Roldan BSc Geop '88, Suzanne Heskin BSc Geop '01, James Heskin, Keith Brownlee BSc Geop '75, Kevin Smith BSc Geop '82, John Wise PRE '68, James Messer BSc Met '92. Photos by Will Cup.



Rocky Mountain

Utah → Bob Pearson '59 traveled to Utah to watch the Orediggers soccer team compete in two games the last weekend in August. Afterwards, the team and supporters met for an after-game meal.



← **Grand Junction, Colo.** Aug. 14, the Grand Junction section sponsored a send-off party for new freshmen from that area. Thirty-six people attended along with three new freshmen and their parents.

Denver Metro



The August mixer at the Wynkoop Brewery, owned by Denver's new mayor, John Hickenlooper, drew some regulars and some new faces.



"Welcome"
Class of 2007

This year's freshman class was welcomed by volunteer alumni (wearing the red shirts) who helped out on move-in day at the dorms Aug. 15. The Alumni Association also sponsored a picnic for freshmen and their families that day and about 225 people showed up at the Coolbaugh House for a barbecue lunch. The following Monday, alumni volunteers distributed water during the M-Climb in the morning and flipped burgers and mingled at the graduate student picnic held on Kafadar Commons that afternoon.

If you'd like to help at future fun events, contact the Alumni Office at 303-273-3295 or e-mail to csm.aa@mines.edu.



RESEARCH

- Recovering methane from sandstone aquifers is being explored in a new approach that works by dewatering the aquifer to recover trapped gas. Because this technique generates a fair amount of produced water, economic ways to treat the water for beneficial reuse to make the process more attractive are also being studied.

- The Reservoir Characterization Project focuses on acquisition, processing, interpretation and visualization of time-lapse geophysical data – repeated measurements over an operating field that help detect and track changes in the subsurface due to the movement of fluids (water, oil, gas) in the production and enhanced recovery processes.

- The Center for Wave Phenomena focuses on new theoretical and computational techniques for processing seismic data from fractured reservoirs. Such data exhibit all the complexities associated with wave propagation through inhomogeneous, anisotropic geologic environments and demand sophisticated mathematical techniques applied to the data using computationally intensive algorithms on parallel clusters of Linux processors. The Center develops, maintains and supports the open-domain Seismic Unix processing system, which has been installed on nearly 3,000 systems in more than 60 countries around the world.

- Mines expertise in scientific computing and numerical analysis provides computational modeling of gas flow and scientific data visualization, an essential component in data analysis for reservoir characterization.

- The huge natural gas resources locked in dirty, low permeability “tight” geologic formations common in the Rocky Mountain basins are the focus for research in well stimulation hydraulic fracturing techniques. New computer modeling techniques simulate 3-D and 4-D reservoir behavior.

- The Center for Hydrate Research studies natural gas hydrates that are encountered in energy exploration and production. In exploration, the Center measures and models hydrates in the oceans. In production, it concentrates on flow assurance, i.e., keeping the pipelines free of hydrate plugs – the estimated cause of >90% of the flow obstructions in deepwater gas production sites around the world.

- Researchers are investigating the quantitative kinetic characterization of reaction systems, especially those where kinetics and transport are coupled. Reactions that occur during direct hydrocarbon oxidation in high-temperature solid oxide fuel cells are being studied. Once the gas-phase and heterogeneous kinetics have been



characterized, they can be included in the combined transport-kinetic models needed for optimization of fuel cell performance.

- New processing techniques are being designed and new and improved materials are being developed for the synthesis of thin film electrodes, solid electrolytes, the minimizing of corrosion and oxidation problems and the maximizing of transport efficiencies in proton transfer fuel cells, PEM fuel cells, and solid oxide fuel cells.

- Using a combination of electronic structure calculations and chemical activation analysis, researchers are identifying the effect of pressure and temperature on the product distributions of key reactions that lead to production of the aromatic precursors that ultimately lead to formation of soot and/or deposits in an effort to reduce pollution.



- The green alga *Chlamydomonas reinhardtii* generates H₂ by means of an Fe-hydrogenase-mediated system that has the highest potential energy efficiency of any known photosynthetic H₂-generating mechanism. To maximize the hydrogen-producing capacity of the algae, researchers are working to optimize a known hydrogenase through molecular engineering to identify enzymes involved in the regulation of hydrogenase synthesis and to develop a new high-throughput assay for biological H₂ production.

- Research on the pyrolysis of biomass includes developing new pyrolysis reactors to produce hydrogen from tree thinnings obtained from western forests.

- Better transparent conducting oxide layers for photocell applications are being developed to bring fusion energy to commercial reality. A charged particle detector that can withstand the extreme conditions inside the fusion reactor vessels has also been developed and can be used to diagnose the fusion production.

- Innovative new metal-substituted hexaaluminate catalyst materials that show good activity as lean-combustion catalysts with excellent high temperature stability for catalytic combustion are being developed.

- Modern diesel injectors are very high pressure resulting in improved fuel atomization. Since fuel/air mixing is a critical component for in-cylinder control of emissions, full utilization of this new injection technology requires a deeper understanding of the transient diesel mixture preparation/combustion process. The combined experimental and modeling effort aim is to improve the understanding of the relationship between fuel injection as a controlling parameter for diesel efficiency and emissions.

university in the United States with programs from the baccalaureate through the doctorate in all of the key fields related to energy.

The School is home to the Colorado Energy Research Institute, recently reestablished with support from the Colorado Energy Management and Conservation. It develops energy research and educational programs throughout the state including fossil fuel, renewable and alternative energy technology, as well as energy efficiency and conservation. In addition, the School houses 13 centers and institutes directly related to energy. CSM also has a unique collaboration with industry in its development of The Petroleum Institute in Abu Dhabi, which opened its doors to students in 2001.

All Mines departments and divisions are involved in energy-related projects including fossil fuels, alternative energy sources, combustion, nuclear energy and materials, energy storage technology, power distribution technology, and energy economics and policy. Much of the study is interdisciplinary. For example, molecular hydrogen (H₂) is a promising future energy carrier because of its clean combustion and potential for sustainable production and is being studied in a variety of ways. One problem associated with an economy using hydrogen is that the energy and power density of gaseous H₂ is low unless the gas is highly compressed. So, for example, the range on a hydrogen fuel cell car is only a few miles unless we compress the hydrogen to high pressures. Mines researchers are working on a variety of possible solutions to this problem.

In addition to hydrogen fuel cells, researchers at CSM are studying solid oxide fuel cells, which will convert a hydrocarbon, like gasoline or ethanol (ethyl alcohol), directly into carbon dioxide, water and electricity. These efforts could make it possible to use the

A LEADER IN ENERGY

“A new energy economy is emerging, focused not only on the affordable and environmentally sound development of fossil fuels, but also on a rich array of emerging new energy technologies,” says President John U. Trefny. “Mines stands ready to play a leadership role in the development of this new energy economy, helping to build a better future for the citizens of Colorado, the United States and the world.”

The Department of Energy has projected that the world’s total energy consumption will rise by 59 percent between 1999 and 2020. Standards of living are closely related to energy consumption and a study conducted in 2000 by A. Pasternak found that the United Nations’ Human Development Index (a measure of basic human well being) begins to level out at an annual per capita electricity use of about 4000 kilowatt hours. Reaching this level worldwide would require the production of significantly more energy than has been projected.

It has been predicted that the world’s reliance on fossil fuels will decrease from approximately 70 percent in 2000 to only about 14 percent by 2100. Whether or not this proves accurate, dramatic changes can be expected and Mines, with its special focus on the Earth and the responsible stewardship of its resources, is uniquely positioned to play a prominent role in current and future energy issues. In fact, energy and related fields are explicit in the statutory mission of the School. Mines is the only

RESEARCH

■ Spray rolling, an innovative and energy-efficient manufacturing technique to produce aluminum net-shape products, is being studied. Spray rolling combines spray forming and twin-roll casting. It requires less energy and generates less scrap than conventional processes and, consequently, enables the development of materials with lower environmental impact in both processing and final products.

■ Understanding ignition kinetics is essential to being able to reliably characterize events such as ignition in a low-temperature homogeneous charge compression ignition (HCCI) engine. The improved mechanisms can be used to suggest combinations of fuel and engine conditions that should lead to more robust operation of the HCCI engine.

■ The OpenChem Workbench (OCWB) Project is developing an integrated suite of reaction engineering software utilities for the simulation of gas-phase chemical reactors. The aim of this software is to put powerful chemical reactor modeling tools into the hands of a broad array of chemists and chemical engineers. Only specialists have the expertise to operate the current software. The types of processes that can be modeled and optimized using the OCWB include some of the most energy-intensive operations in the chemical process industries: combustion and pyrolysis/cracking.

■ A process and a reactor to deposit CdTe films by atmospheric-pressure chemical vapor deposition are being designed. The atmospheric-pressure process has potentially great advantages over vacuum-based processes for the high volume production that is needed for cost-effective manufacture of terrestrial photovoltaic systems. Photovoltaic research includes chemically reacting flow modeling to support manufacturing reactor design and control, development of chemistry models for the CdTe deposition process, and film growth and process demonstration.

■ How to minimize radioactive wastes produced by nuclear energy plants and what surrogate materials might be used for devolving techniques for radioactive materials processing are being studied.

■ Bacterial colonies in permeable reactive barriers to passively treat uranium-contaminated groundwaters at abandoned uranium mine sites are being studied. One consequence of uranium mining is widespread contamination of groundwaters. A number of technologies are available for treating uranium-contaminated groundwaters



but their general high cost and relative inefficiency make them impractical. Bacteria are being used to transform uranium from the soluble, mobile oxidized form to one that is reduced and less mobile.

■ New materials and processing techniques for long life, rechargeable batteries are being developed, as well as new materials (intermetallics, carbon nanotubes and nano particles) and processing techniques for improved hydrogen storage capabilities.



■ Electrical energy systems engineers are concerned with all aspects of generation, transmission, distribution and utilization of electrical energy. They are pursuing both fundamental and applied research in the interrelated fields of conventional electric power systems and machinery, renewable energy resources, distributed power generation and power electronics. Current research includes application problems in power systems, energy engineering education, power quality, variable drives, microgrid system and interconnection issues to deal with distributed generation.

■ Researchers are studying the application of risk and investment theory to the petroleum industry to provide guidance to firms and decision makers with regard to developing strategies, allocating resources and managing risk. Another focus is on the integration of portfolio management and decision analysis, the application of portfolio management to oil and gas exploration and production, an investigation of corporate risk tolerance and performance in oil companies, and a behavioral study of risk taking at a major oil company.

■ Recent energy-related doctoral research developed a system of integrated software applications to allow the Minerals Management Service to maximize royalty revenues from natural gas production on federal properties, particularly in the Gulf of Mexico. The mathematical model constructed decides when it is profitable to consider conversion from royalties in-value (cash payments) to royalties in-kind (physical molecules of gas).

■ Researchers are studying connections among natural resources, political corruption and development, with a particular focus on petroleum. How do the different governments manage windfalls and rents from abundant natural resources, such as petroleum, and why do these countries tend to perform worse economically than those without similar endowments?

into electricity, are only economically feasible in small power applications such as calculators or in remote applications where it is too expensive to introduce a power line.

Much Mines research continues to focus on fossil fuels. Researchers are studying ways to recover more oil and gas from known fields, improving drilling technologies for applications on Earth and in space, such as on the moon and Mars, and improving long-reach horizontal wells, multi-lateral wells and smart wells.

Markets for coal, electricity, petroleum and natural gas also are being analyzed with special focus on differences in the competitive structures of these markets and implications for public policy. A recent study discusses energy and the information revolution and how cultural differences affect management in the multinational world of energy. Another focuses on the problems facing national economies that are dependent on energy production and examines the relationship between government revenues from oil production and macroeconomic policies.

Researchers are studying combustion to develop cleaner and more efficient engines and to use catalytic combustion within gas turbines. Catalytic combustion limits the formation of nitrous oxides in the combustion process. Other studies examine ways to minimize radioactive wastes produced by nuclear energy plants and bacterial colonies that passively treat uranium-contaminated groundwater at abandoned uranium mine sites.

While it is impossible to predict the future, it is clear that significant changes in energy production and policy are coming. Mines, with its major investment in energy research, will be at the forefront of this change.

By Maureen Keller

fuel cell with hydrocarbon-based liquid fuels before the hydrogen economy is fully developed because we already have a vast infrastructure to handle liquid fuels. Handling compressed gaseous fuels, like H₂, will require an enormous infrastructure change.

Others are studying problems associated with the proton exchange membrane (PEM) fuel cell. Current PEM fuel cells use materials that must be fully hydrated to function well and are therefore limited to operating temperatures below 100 C. Currently, only platinum can be used with these temperature limitations and it is expensive, so a class of inorganic proton conductors is being studied that can work at temperatures up to 250 C. Researchers are hoping to discover cheaper catalysts that can one day replace platinum and dramatically reduce costs.

Two researchers have recently received funding to develop models for a "Palm Power" miniature fuel cell to provide 20 watts of power for 72 hours on a half-liter of diesel fuel. High temperature, ceramics-based fuels cells that can operate directly on hydrocarbon fuels is another energy source being developed. Researchers are working on small power sources for the military that are intended to replace batteries. They are being designed to use jet fuel or diesel fuel.

Understanding and improving the efficiency and durability of solar cells is another area of study. Currently solar cells, which convert sunlight directly



Endowed Faculty Chairs Help Drive Research

Colorado School of Mines is able to maintain its position as a national and international leader in energy thanks to its ability to attract top research scientists and engineers. In addition to the School's longstanding reputation for excellence in energy, several distinguished endowed chairs and professorships that help retain highly talented faculty have been created in energy-related disciplines. The holders of these endowed positions attract support from a range of public and private agencies for the development of innovative energy-related research and instructional programs. Furthermore, their stature and accomplishments draw additional faculty members and high caliber graduate students interested in furthering the specific field of research.

Mines is currently fortunate to have faculty occupying 17 endowed chairs and professorships, many of whom are conducting energy-related research. Six such individuals are featured below:

Dr. Anthony M. Dean is Mines' William K. Coors Distinguished Chair in Chemical



Engineering. Dean joined the faculty of Mines after serving 21 years at the

Corporate Research Laboratory of ExxonMobil Research and Engineering Company; prior to that he taught at the University of Missouri. A board member of the Combustion Institute, Dean is currently researching reactions that occur during direct hydrocarbon oxidation in high-temperature solid oxide fuel cells, with the goal of developing a means to optimize fuel cell performance. Dean is also working on identifying hydrocarbon structures that are less likely to produce the specific free radicals that lead to soot or deposit formation.

Dr. Robert J. Kee, the George R. Brown Distinguished Chair in Engineering, is the



former manager of the Thermal and Plasma Processes Department of the Sandia National Laboratories and the winner of such awards as The Silver Medal of the Combustion Institute, The Bastress Award for Outstanding Contributions to Technology Transfer, and DOE Basic Energy Sciences, Sustained Outstanding Research in Materials Chemistry. Kee is currently working on a portfolio of alternative energy research projects, including solid-oxide fuel cells, catalytic combustion, and thin-film photovoltaics. All of these technologies will help advance

the energy industry's efforts toward environmentally-friendly and sustainable production and distribution.

Dr. Kenneth L. Larner Geop E '60 and PhD graduate from MIT, is the Charles Henry Green Professor of Exploration



Geophysics and the director of CSM's Center for Wave Phenomena. Prior to joining the faculty of Mines, Larner was the vice president for geophysical research at Western Geophysical Company. Larner, a past president of the Society of Exploration Geophysicists, recently served as a Society of Petroleum Engineers distinguished lecturer, and this year received the P. L. Kapitsa Gold Medal of the Russian Academy of Natural Sciences, its highest award. His research interests include imaging of the Earth's subsurface with an emphasis on application of the seismic method to seismic data processing for exploration and development of hydrocarbons.

Dr. Dennis W. Readey is the Herman F. Coors Professorial Chair in Ceramics and past president of the American Ceramic Society. Before coming to Mines, Readey was chairman of the Department of Ceramic Engineering at Ohio State University and prior to that he was a program manager in the Division of Physical Research of the Department of

Energy. Readey directs CSM's Colorado Center for Advanced Ceramics, which is



currently researching fuel cell, solar cell and battery materials with funding from the National Renewable Energy Laboratory (NREL).

Dr. E. Dendy Sloan is the Gaylord and Phyllis Weaver Distinguished Professor in Chemical Engineering and Petroleum



Refining and the director of CSM's Center for Hydrate Research. Sloan is the recipient

of numerous campus and national awards, including the Presidential Award as Outstanding CSM Educator, the CSM Faculty Senate Distinguished Lecturer Award, and the Donald L. Katz Research Award of the Gas Processing Association. His history of 30 years of hydrates research has been supported by a consortium of 12 corporations. He is a Fellow of the American Institute of Chemical Engineers.

Dr. Roel Snieder holds the W.M. Keck Foundation Distinguished Chair in Exploration Science. Prior to joining the faculty, Snieder was professor of seismology at Utrecht University, where from 1997-2000 he served as dean of the



faculty of Earth Sciences. In 2000 he was elected as Fellow of the American Geophysical Union for important contributions to geophysical inverse theory, seismic tomography, and the theory of surface waves. Snieder is one of the four faculty members of the Center for Wave Phenomena, a research group that is supported by a consortium of 26 companies from the petroleum industry with the aim of making exploration and production of hydrocarbons more efficient.

Brenda Aird
Bureau of Land Management
Kathleen Benedetto
House Committee on Resources
Michael Brown
U.S. Environmental Protection Agency
Benjamin Burnett
Office of Management and Budget
Richard Christiansen
Colorado School of Mines
David Conover
U.S. Department of Energy
Bill Cooper
House Committee on Energy and Commerce
Mark Gaffigan
General Accounting Office
Carol Hardy-Vincent
Congressional Research Service
Joshua Heird
Office of Senator Wayne Allard
Eli Hopson
House Committee on Science
Jeffrey Hunt
Bureau of Indian Affairs
Eloise Kendy
American Geological Institute
Christopher King

House Committee on Science
Leland McGee
Bureau of Indian Affairs
Rick Mertens
Office of Management and Budget
Roger Meyer
U.S. Department of Energy
Kyndra Miller
Office of Wyoming Governor Freudenthal
Darren Mollot
U.S. Department of Energy
Brenda Pierce
U.S. Geological Survey
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Natalie Tawil
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Allen Thomas
U.S. Bureau of Reclamation
Trudy Transtrum
U.S. Department of Energy
Gene Whitney
Office of Science & Technology Policy
William Wicker
Senate Committee on Energy and Natural Resources

To Learn More About Energy, Government Policymakers Go to the Source

By Marsha Konegni

Touring energy sites in Colorado, Utah and Wyoming, participants in the 2003 Energy and Minerals Field Institute (EMFI) in August saw a "buffet, a smorgasbord of Western energy resources," as William Wicker described the experience. "It gave exposure to the greatest variety of resources possible," added Wicker, who serves on the U.S. Senate Committee on Energy and Natural Resources.

The EMFI, originally called the Energy Field Institute, was established in 1978 to create a forum for exploring interactions between regional energy development in the West and federal policies. Due to a decline in financial support from the federal sector, many of the Institute's major programs were discontinued in 1996. In 2003 the Colorado Office of Energy Management and Conservation provided funding to reactivate the Colorado Energy Research Institute (CERI), which is administered by CSM. Together with matching financial support and in-kind contributions from CSM, the reestablished CERI provided sufficient funding to the CSM Office of Special Programs and Continuing Education (SPACE) to conduct the summer Institute.

"Through EMFI, the School has provided valuable input to the policymaking process and has gained the recognition and respect of many in the public sector," said Gary Baughman MSc CPR '73, PhD CPR '74, director of SPACE and former EMFI director. Other EMFI organizers were Erling Brostuen, Melody Francisco, Jim Proud and John Rold.

"I now have a better understanding of the whole energy picture. This was a very comprehensive, hands-on week. I work in renewables so the fossils were most interesting to me. I had my eyes opened to things I had no experience with- and experiences are so much better than another PowerPoint presentation. Discussions with both sides showed the amount of compromise that will be necessary in the future."
- Roger Meyer

"The whole package was interesting. I wanted to experience new things, and I had never been to a power plant. I wanted an integrated view of the whole energy picture, and I got it."
-Gene Whitney

The Ponnequin Wind Farm. Located south of Cheyenne on the Colorado-Wyoming border, this wind farm is operated by Xcel Energy.



Vernal, Utah. Jim Kohler, of the Salt Lake City offices of the Bureau of Land Management, points out some ongoing tar sand operations on Asphalt Ridge near Vernal, Utah.



National Renewable Energy Laboratory's Outdoor Test Facility in Golden, Colo. Peter McNutt of NREL explains the operation of the solar collectors at the OTF.



Flaming Gorge Dam in Dutch John, Utah. The EMFI toured the 502-foot-high dam, which houses three 36-MW generators.



Jim Bridger Power Station in Rock Springs, Wyo. Institute participants learn about converting coal into electricity.



Jim Bridger Coal Mine. Jim Johnson BSc Min '77 from the Jim Bridger Coal Mine explains the surface mining operations, including the new high-wall mining process, to Kathy Benedetto (House Committee on Resources), Chris King (House Committee on Science), Ben Burnett (OMB) and Rick Mertens (OMB).



Jim Bridger Coal Mine. Alan Thomas (BuRec) engages in a conversation with a miner.



West Elk Mine in Somerset, Colo. "The Glowworms"—one of the EMFI groups underground at the mine—sport reflective vests.



Engineer Shows Passion for Wildlife and the Environment

Tony Newlin MSc CPR '96 is both an engineer at Intel Corporation and a nature photographer. At Intel, he applies mathematical tools to supply chain optimization. In nature, he captures the beauty of the wilderness on film.

Growing up in northern New Mexico, Newlin often camped with his family in the San Juan Mountains of Colorado and developed an appreciation of the great outdoors. He observed nature long before he decided to photograph it. He mountain bikes, kayaks, hikes or takes a float plane to remote places to find animals in their habitats, where he tries to photograph them without



disturbing them. Newlin now lives in Portland, Ore., and often travels to Alaska.

With no formal training, Newlin became serious about photography in the summer of 1996 while on a kayaking trip in the San Juan Islands. He uses 35 mm Nikon cameras for his photos and sells his prints over the Internet (www.tonynewlin.com) and at various lodges in Alaska. Next summer, he plans to open a gallery in Telluride, Colo.



Dear Fellow Alumni and Friends,

After more than 15 years, I've finally gotten over the dread that comes with the end of summer and the start of classes at CSM. As a matter of fact, I had an absolute ball as the fall semester got underway this year. Of course, I'm not facing a semester of thermodynamics, linear algebra, transport phenomena or any other classes. But still, it was a thrill to be part of the excitement and eagerness of the dawn of a new school year at Mines. For the first time, the Alumni Association participated in some events that I hope will become new traditions for us and the School.

On freshman move-in day, Aug. 15, alumni volunteers helped freshmen and their families get settled in. Alums decked out in snappy red polo shirts were present at each of the dorms greeting students and answering questions, making them feel as much at home as a new frosh can feel in the first five minutes on campus! That same day, the Association and Student Life hosted a



barbecue luncheon for freshmen and their families. It was a wonderful opportunity for alumni and staff to visit with and get to know the students and their families.

Alumni also volunteered on Aug. 18 helping Blue Key and Student Life during the traditional "M" climb. We

manned a water station along the route to help revitalize the kids on their way up Mt. Zion. See the website (www.alumnifriend.mines.edu, then click "Recent Events") for photos. Does that bring back some memories?

Later the same day, alumni volunteers manned the grills and food lines for the Graduate Students Association picnic. We had a great time talking with grad students and flipping burgers and hot dogs as fast as possible.

The positive response from these events from volunteers, students and their families was overwhelming. The alums had a ball and the students enjoyed visiting with those of us Miners who have "gotten out." The freshman parents appreciated the attention and the effort to help them and their frosh get that at-home feeling.

I see two important things in these events: they were done by alumni volunteers, and they involved alumni interacting with students on a personal basis. We may forget sometimes, but the CSM Alumni

Association is a volunteer organization at its heart. We have an extremely dedicated and competent professional staff that takes care of the organization's day-to-day operations, but as our name reminds us, we are an association of Mines alumni.

We are working hard to have a greater presence on campus, to be visible and known to students and faculty, and to be part of the campus experience. I see students as alumni-to-be who will soon join us in the esteemed ranks of CSM alumni. We want them to be part of us, and we want to be part of their lives. To succeed, the Association must engage students as soon as they come to the School. Besides, it truly is enjoyable and rewarding to spend time with them!



Remember, the Alumni Association is all about people – people who have graduated from Mines – or will some day – and people who love the School as deeply as do we. As I mentioned at the start of this letter, I hope these events will take root and become traditions for the Association and the School. I also hope that as the year continues, we can build upon the success of these events and create more opportunities and more traditions. Even if you don't live within reach of campus, make the opportunity to meet Mines students and their families from your hometown. Participate in the send-off parties and the Alumni Admission Representative program. Return to campus for Homecoming and Reunions. It is our responsibility to help shape the future of the body of Mines alumni by becoming actively involved on a personal level with each other and with our future fellow alums!

Sincerely,

John N. Schwartzberg BSc Met '88, P.E.
President, Colorado School of Mines Alumni Association



- | | | | | |
|---|---|--|--|--|
| Gary R. Abbott BSc Eng '94
Natalie A. Abbott BSc Geop '95
Evan R. Anderman M Eng Geol '93, PhD Geol '96
Arvid N. Anderson Met E '54
John B. Ashby BSc Geol '78
Scott A. Baker BSc Geop '93, Geol E '00
William P. Bartow BSc Min '73, MSc Min Ec '75
Sohrab R. Batmanglij Geop E '69
Catherine C. Bedwell BSc CPR '94
John L. Bedwell PhD Geop '74
John R. Beers P E '53
John H. Benton BSc Pet '78, MSc Pet '84
Gerald W. Berk P E '62
Eugene V. Bermudez BSc Eng '94
Donald L. Bingham Phy E '64
Benjamin E. Binkley Geop E '52
James R. Boone E M '39
Toni A. Bowden BSc CPR '95
James A. Bowler E M '39
John A. Bowler III Geop E '60
Albert H. Brookes Met E '36
Kelly M. Brown BSc Pet '93
Lynn A. Brown Geol E '50, DSc Geol '70
Mark J. Brown BSc B E '77
Sara K. Brown BSc CPR '93
Darren A. Buck BSc Eng '94
Kristan K. Buck BSc CPR '92
Bart J. Burns E M '52
Jan E. Caffey MSc Min Ec '91 | Jenny Canepa Camardo BSc CPR '96
Charles A. Champion Geol E '52
James S. Classen Geol E '57
Jack D. Cline BSc Min '74
Catherine A. Collins BSc CPR '88
Stephen Collins BSc Phy '86
Ronald J. Cooper P E '69, MSc Pet '70
David B. Crawford II BSc Pet '77
James G. Cunningham P R E '47
Daniel J. Cutting BSc CPR '96
Vanessa A. Davies-Pappas BSc Math & Comp Sci '99, MSc Math & Comp Sci '01
John P. Dempsey Met E '49
Brian C. Dille BSc Met '95
Thomas E. Dimelow Geol E '66, MSc Geol '73
Dennis G. Downing BSc CPR '94
Frederick F. Dueser P E '49
Richard D. Dunham BSc CPR '74
Frederick H. Earnest BSc Min '87
Randy G. Edelen BSc Eng '97
Rodney J. Eichler BSc Geol '71, MSc Geol '73
Jess A. Elshere BSc Eng '88
John B. English Met E '40
Lynn D. Ervin Geol E '40
Hugh W. Evans E M '49
Jon A. Ferris Geop E '64 | Marvin E. Gantz, Jr. Met E '40
Louis E. Gaspar E M '45
Paul R. German BSc Eng '00
Shivarao Y. Ghorpade Met E '62
Melanie D. Gipe BSc CPR '81
John R. Guffey BSc Pet '84
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Ann E. Hanson BSc Geop '81
Christopher D. Harden BSc Eng '00, BSc Econ '00
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Jennifer J. Holt BSc Geop '96
James R. Howell E M '66
Perry K. Hurlbut Geol E '40
Gary L. Hutchinson E M '62, MSc Min Ec '89
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Jennifer M. Jesseph BSc Eng '95
Warren O. Johnson P E '49
Thomas C. Jones BSc Eng '90
Michael R. Kennedy BSc Pet '82
Jacquelyn B. Kircher P R E '49
Darrell L. Kramer MSc Geop '84, PhD Geop '91
Carl F. Krueger Met E '53
John G. Kunkle BSc Min '86
Stefany B. Lewis BSc Geop '99
J. Donald Longenecker E M '60
Robert W. MacCannon Met E '51, E M '54
Addison B. Manning Geol E '40
Mr. J. Paul Mathias P E '63
Mr. Norman E. Maxwell, Jr. P E '41 | Michelle M. (Moore) McCassey MSc Min Ec '00
Wallace McGregor Geol E '52
Harold P. Meabon MSc Pet '65
Jesse R. Medaris P R E '49
Larry C. Medina BSc CPR '88
Beth Mensing-Nahama BSc Pet '89
Gordon M. Miner E M '48
Antonio Moraes Met E '49
Robert L. Morse BSc Min '74, MSc Min Ec '76
Michael J. Muhr BSc Geol '91
James M. Murphy Geop E '50
Todd J. Mushovic BSc Pet '92
Joseph A. Nahama MSc Pet '90
Michael R. Niznik BSc Pet '92
Thomas E. Northrop E M '32
Randall B. Ollmann BSc Eng '98
Andrew L. Olson BSc Geol '99
Angela A. Olson BSc Eng '00
Richard E. Oppel Geol E '51, MSc Geol '53
James F. Orofino Geol E '57
Paul E. Pastore BSc Eng '89
John Petrocco Geop E '50
Karen R. Phelps BSc Eng '96
Randall J. Phelps BSc Eng '96
J. Douglas Pitts Chem E '69
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Colleen T. Porro MSc Geol '84
Marc T. Pottorf Geop E '67
Erin A. Powers BSc Met '88
Amber L. Price BSc Geop '97, | M Eng Geop '99
M. MacLean Price BSc Pet '95
Stephen E. Randolph BSc Pet '82
Terrill W. Ray BSc Geop '90
David C. Raymes BSc Geop '84
E. Avery Reed E M '65
Irvin M. Rice E M '39, MSc Min '47
Michael L. Richards BSc Eng '87
Michael D. Ringler BSc Geol '88
John D. Rogie BSc Geol '96
Norman A. Ross E M '69, MSc Min '70
David A. Rowland P E '49
William C. Rump P E '33
Bruce E. Russell Geol E '58
Charles R. Russell, Sr. P R E '54
Samuel C. Sandusky P E '48
John R. Schmedeman Math E '66
Frank A. Seeton E M '47
Richard R. Severns Met E '60
L. Arthur Shannon Met E '40
Stanley E. Shaw BSc Pet '83
Burleigh W. Shepard Geol E '51
Robert D. Sloan P R E '49, MSc PRE '52, DSc PRE '57
C. Ogden Smith Geop E '59
Richard D. Smith Met E '68
Chad C. Soliz BSc Geop '93
Stephen A. Sonnenberg PhD Geol '81
Joseph R. Soper, Jr. Met E '44
John W. Stockwell, Jr. BSc Geop '80
Kurt-Martin Strack MSc Geop '81
Timothy E. Sumpster BSc CPR '94
Paul R. Swanson Met E '51
Lin Han Tan BSc Eng '96
Jon R. Taylor BSc Met '77
Roderick A. Thomas, Jr. P E '52
Brett W. Thompson BSc Eng '98
John P. Tiernan BSc Eng '86
Robert L. Townsend BSc Eng '95
Steven Y. Vandenberg BSc Geop '82, BSc Math '82
Giuliano G. Verdina MSc Pet '66
Tom J. Walker BSc Pet '89
William C. Ward BSc Pet '84
Richard A. Wertz BSc Math '97
Gysbert J. Wessels PhD Min Ec '89
James B. Whitfield BSc Math '85
Barth E. Whitham BSc Pet '79, MSc Min Ec '82
Richard G. Williamson BSc Geop '82
Sally A. Williamson MSc Geop '86
Kurt A. Wittges, Jr. Geop E '52
Charles V. Woodard Met E '44
Sandra J. Wrobel BSc CPR '82 |
|---|---|--|--|--|

Become a Member of the Alumni Association

ANNUAL MEMBERSHIP

\$55/yr. for '00 and earlier grads; \$100 for two years ('03 & '04)
\$30/yr. '01 and '02 grads -- \$54 for two years ('03 & '04)

JOINT MEMBERSHIP (Both spouses grads)

\$65/yr. for '00 and earlier grads -- \$120 for two years ('03 & '04)
\$40/yr. '01 and '02 grads -- \$70 for two years ('03 & '04)

SENIOR MEMBERSHIP (65 or older)

You must have been an active member for at least 15 years. (Need not be consecutive.)

LIFE MEMBERSHIP \$1000 or \$200/yr. x 5 years

JOINT LIFE MEMBERSHIP \$1250 or \$250/yr. x 5 years

Name _____

Address _____

My check is enclosed (Made payable to CSMAA).

Please bill to my Mastercard # _____ Expiration date _____

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Contributions to CSMAA are deductible under Section 501(c)(3) of the Internal Revenue Code. In accordance with IRS guidelines, the CSMA Alumni Association provides no goods or services in exchange for your gift. CSMAA funds are not part of the Mines Annual Fund.

MAIL TO:
CSMA Alumni Association
P.O. Box 1410
Golden, CO 80402-1410
or sign up on line:
csmaa.mines.edu
Click on "Membership" under Action Items

History of Kudos



The Alumni Association has a long tradition of honoring those who have been especially loyal and helpful to the Association and the School. Alumni awards include Honorary Memberships, the Outstanding Alumnus Award, the Melville F. Coolbaugh Award and the Young Alumnus Award.



Earl O. Kistler

In 1929, the Association's first Honorary Membership was conferred on Erle O. Kistler. Kistler volunteered his services as football coach in 1912 after the Mines team had suffered "three unsuccessful and dreary seasons," according to the 1929 *Mines Magazine* that announced

the honor. Kistler turned things around immediately. "The 1912 season closed in triumph, with the Miners the undisputed champions of the Conference," said the article. "Kis," as he was called, led the team until 1914 when he resigned because of business activities. But in 1923, when the team's future once again



looked gloomy, he returned as "an 'inspirational Coach,' talking to the boys on the field and injecting spirit and enthusiasm into them." Although not a Mines graduate himself (he was from Yale and had played fullback on one of its famous teams), he nonetheless "placed Mines on the football map."



Thomas A. Manhart

Since 1929, the Association has conferred Honorary Membership on 204 men and women for a variety of activities. The list includes past and current CSM presidents, 10+-year Association employees, professors, friends of the School and volunteers. Honorary Members have the same rights and privileges as dues-paying members.



William M. Mueller

A second Alumni Association honor was instituted in 1983. The Outstanding Alumnus Award, presented to **Thomas A. Manhart Geop E '30** and **William M. Mueller Met E '40, MSc Met '49, DSc Met '52** that first year, is for a member of the Association who "has contributed meritorious service on behalf of the CSM Alumni Association." The award, an engraved plaque, is presented during May Reunions.



Claude L. Barker

Manhart was chairman of the Mines Annual Fund effort and was a charter member of the School's International Resource Council. Mueller was professor, dean of faculty, vice president of Academic Affairs and an interim executive director of the Association. Both men were life-long members of CSMAA.

A third award was established, also in 1983, by the Class

of 1933 during its 50th reunion. Called the Melville F. Coolbaugh Award, it was named in honor of the man who served as CSM president from 1925-1946. The award is given to someone "who has made an outstanding contribution toward improving the image and enhancing the reputation of the School." The first

recipient was **Claude L. Barker EM '31**. Barker was active in industry, School and Association affairs. Among other things, he headed up the Colorado Mining Association summer educational program to



David L. Coolbaugh

familiarize high school teachers with the mineral industry. In 2002, **David L. Coolbaugh Geol E '43, EM '47, DSc Geop '61** won the award that was named after his father. Dave has a long history of service to the School and the Association. He currently chairs the CSM History Project, which is overseeing a book to be published next year. The recipient of this award need not be an alumnus. In 1995, the award was given to Bob Weimer, a CSM geology professor from 1957-1983. Frank Stermole, a chemical engineering and mineral economics professor, received the award in 2001.



Robert Weimer

The Young Alumnus Award was instituted in 1986. Because the Association's other awards usually are given to mature alumni with many years of service, the Association's board of directors decided to establish recognition for young alumni who show enthusiasm for supporting the Mines community early in their careers. The award is given to alumni under 40 who received their first Mines degree within the past 15 years. The first recipient was **Timothy L. Hoops BSc Geol '79** who was recognized for his work in establishing the CSMAA annual golf tournament. To date, the tournament has raised \$102,500 for the emergency student loan fund.



Frank Stermole

Honorees of CSMAA awards have their names engraved on plaques displayed in the Association office. A complete list of winners also appears in the annual directory. If you know of a deserving person who should be honored by the Association, please submit the name, along with backup material, to the CSMAA office.



Timothy L. Hoops

By Maureen Keller

LOOK WHO'S RUNNING FOR OFFICE

Active Alumni Association members will receive a ballot in the mail along with the membership drive. Several positions on the CSMAA board will be filled in February 2004. Candidates for the open positions are profiled below. The only contested position is secretary. Please return your ballot to the CSMAA office by Jan. 31.

CSM Foundation Director (2-year term)

Vicki Cowart MSc Geop '77 is president and CEO of Planned Parenthood of the Rocky Mountains (PPRM), which operates 32 health centers in six states. Prior to joining PPRM, she was the Colorado State Geologist and director of the Colorado Geological Survey (CGS). Since 1993, she was the head of that scientific agency within the Colorado Department of Natural Resources. At CGS, Cowart directed the agency's budget of about \$4 million with a staff of about 50. During her tenure as state geologist, Cowart served as president of the Association of American State Geologists, the organization of the chief executives of all 50 state geological surveys.



CSMAA President-Elect (1-year term)

Alan J. Mencin BSc CPR '79, currently CSMAA treasurer, is a planning services specialist with Mencin & Associates and CapWest Securities. He is president and CEO of ACM, Inc., a computer-network design company. He is also a licensed Professional Engineer in Colorado. Mencin is actively involved with the Metro-Denver Section Committee. He received an MBA from University of Denver in 1989, where he was a founder of DU's Graduate Business School (now Daniels Business School) alumni association.



Treasurer (1-year term)

Kathleen A. Altman BSc Met '80 is a consulting metallurgical engineer in Denver. She has worked for numerous companies including CF&I Steel Corp., Climax Molybdenum Co., Barrick Goldstrike Mines, FMC Gold and SNC-



Lavalin America. Altman holds master's and doctorate degrees from the Mackay School of Mines at University of Nevada, Reno, and has worked internationally on five continents. She was on the committee that wrote the history of women at Mines as part of the Caldwell Centennial Celebration. She is a member of the Society of Mining Engineers and has been a member of CSMAA since graduation.

Secretary (1-year term)

Roger Newell MSc Geol '71 is a mineral exploration geologist and mine developer. He is vice president of development for Capital Gold Corporation and is responsible for world class gold discoveries, mineral property developments, acquisition opportunities and evaluations. He has a close working relationship with other industry leaders including CEOs in corporate and professional organizations within the exploration and mining community. His professional achievements include major exploration discoveries, joint-venture negotiations, resolution of major legal disputes and managing multi-million dollar budgets. He is active in numerous professional organization and has been a CSMAA member since 1984.



Ben Panfalone BSc Eng '97

is a financial representative with the Northwestern Mutual Financial Network. Panfalone is active with the CSMAA in the Denver Metro area and led a variety of student organizations during his time at CSM. Notably, he served as president and programs director of the student chapter of ASME, formed the current bicycling club and served two years as president, and served as president of the Non-Traditional Students. Panfalone currently participates in the Boulder Chamber of Commerce ambassador program.



CSMAA Gulf Coast Regional Director (3-year term)

Charles R. "Chuck" Russell PRE '54 is CEO and manager of I.T. Search, a Houston-based management consulting

firm. He previously was with the Coastal Corp. in Houston and also spent 13 years with Richfield Oil Co. Russell is a retired colonel in the U.S. Army Reserve and past president of the Houston chapter of the Association of Information Technology Professionals. He was Alumni Association section coordinator in Los Angeles and Corpus Christi, Texas, prior to moving to Houston. During the '80s and '90s, he was a section coordinator in Houston and served on the board as the Gulf Coast Regional Director for six years. In 1995 he was named Outstanding Alumnus by the Association.



CSMAA Central Regional Director (3-year term)

Don Ott Geop E '63 is a manufacturer's agent for manufacturers of electronic parts and is a part-time adjunct instructor. After service in the U.S. Army's Corps of Engineers in Vietnam and Korea, he earned an MS degree in engineering administration from Southern Methodist University in 1971. His past experience includes several years as a geophysicist. Ott lives in the Tulsa area where he is an active member of the Tulsa area alumni group.



CSMAA Rocky Mountain Regional Director (3-year term)

Del Tolen PRE '57 has spent 45 years in the petroleum refining industry with various companies. He served three years in the Army before attending Mines. While in school, Tolen ran on the track team, got married and began a family, ending up with five sons. During his career, the Tolens lived in Kansas, California, Oklahoma, Alaska and several other places. Tolen helped get the Bakersfield alumni meeting monthly, which continues today. He semi-retired to Grand Junction, Colo., and inspired alumni there to meet for lunch monthly. His section also hosts send-off parties in August, holds a barbecue before the Mines-Mesa State football games and hosts the women's basketball team after their games at Mesa.

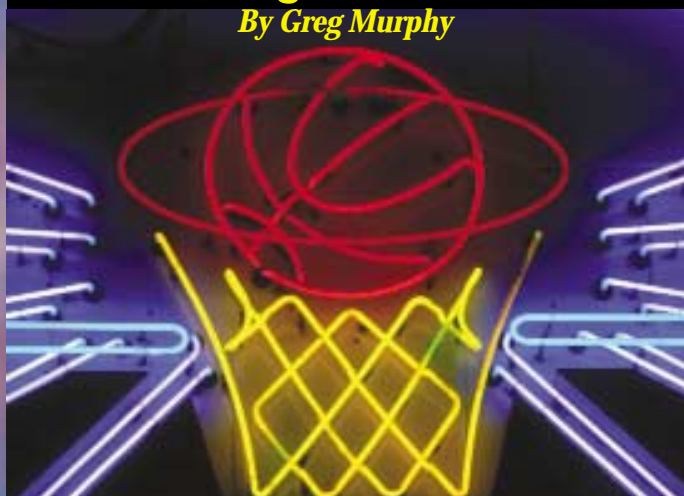


This past winter, a pair of longtime Mines head coaches decided to call it a career. Michele Harris, a 10-year mentor of the volleyball program, decided to step away in order to devote more time to her family. In addition, Vic Doperalski, a 10-year veteran of the women's basketball program, decided to retire from his duties.

Athletics Director **Marv Kay EM '63** and two search committees, committed to finding quality coaches to keep the programs going in the right direction, finally decided on Shelly Johnson as

New Leading Ladies in Golden

By Greg Murphy



transition very easy. I am very comfortable around the office and absolutely love the small town atmosphere of Golden."

Both coaches have benefited by hiring outstanding assistant coaches for their respective programs. Krueger speaks highly, day in and day out, of her assistant Mike Jacobsma. "Mike epitomizes what college basketball assistants are all about. He is the first one to arrive and the last to leave. We came from the same conference so we know each other's styles. It was a perfect fit."

the head volleyball coach and Paula Krueger to take over the women's basketball program. Johnson arrived in Golden after serving the past three seasons as an assistant coach at Wayne State (Neb.), while Krueger came to CSM after a successful six-year stint as an assistant coach at Northern State.

In addition to their coaching skills, both were standout athletes. Johnson was selected as an NAIA All-American in 1990 at Wayne State and Krueger was named the Most Valuable Player of the Division II National Tournament during Northern State's National Championship campaign in 1993-94. Each coach hopes to bring with them ideas and concepts they have already learned as players and coaches.



"When I was at Northern, it was all about tradition," Krueger said. "I want to establish that same idea of tradition here at Mines and increase overall school spirit and support for all athletic teams." Since the new coaches arrived on campus in July, both have added new dimensions to their respective programs and are ready to take them to new levels.

"I was extremely excited to join the volleyball family, as well as the athletics staff here at Mines," Johnson said. "The timing of the announcement was perfect for me personally and professionally. The community of Golden and the entire administration have welcomed me and been very supportive."

Krueger echoed those comments saying, "The athletics staff has embraced both Shelly and I with open arms and has made the

Meanwhile, Johnson is extremely excited to have Kasey Meyer by her side after Meyer lettered four years as a setter at Wayne State, including the final three seasons with Johnson as an assistant coach. "It's great to have Kasey here teaching the setters," Johnson said. I can rely on her to take the setters aside and talk to them one-on-one. She works with the setters daily and I trust everything she says and does will benefit the team this season."

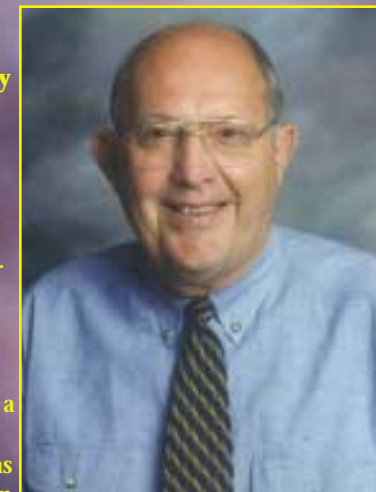
Johnson began her coaching career at the Clash in the Foothills Tournament hosted by Mines and Colorado Christian. The Orediggers posted a 2-2 mark at the Tournament, including a convincing 3-0 victory over Montana State-Bidings in Johnson's first match as head coach. In addition, Johnson coached her squad to a convincing 3-0 win at Mesa State on Oct. 4. The Mavericks were picked by the conference coaches to win the RMAC West Division this season.

On the other hand, Krueger will ease into her game competitions with the first women's basketball game slated for Nov. 15 at Mesa State. "Anytime you come into a new program, it's good to set realistic goals for the team," Krueger said. "I expect nothing less than the best from myself and the players on the court. As for this season, I hope we can double the win total from last season and turn the corner in becoming one of the top teams in the conference."



Longtime Oredigger Marv Kay to Retire

Colorado School of Mines Athletics Director **Marv Kay EM '63** has announced that he will retire from his position at the end of the 2003-04 school year. He has served as the athletics director at Mines since 1995.



Kay began his career at Mines as an undergraduate student. He graduated with a degree in engineering in 1963. While at Mines, he was a standout offensive lineman with the football team and was named the Outstanding Sophomore and Junior Athlete at CSM, as well as a Small College All-American. Following graduation, Kay signed as a free agent with the Denver Broncos.

After spending the next three years away from Mines, Kay came back to his alma mater to serve as the head freshman football coach and swimming coach from 1966-67. The following year, he was named the defensive coordinator of the varsity team and served in that capacity from 1967-69 until he was promoted to the head coaching position in 1969. He was then named an assistant athletics director in 1980.

Kay served as the Oredigger head football coach until 1995 and is the all-time winningest coach in school history with 84 wins. In addition, Kay was named the Rocky Mountain Athletic Conference Coach of the Year and the American Football Coaches Association District Coach of the Year in 1975 and 1979, as well as the National Intercollegiate Athletics District Coach of the Year in 1975.

In addition to his service at Mines, Kay has been an instrumental figure in the city of Golden. He has served as the chairman of the Golden Buffalo Bills Day Celebration, the chairman of the Golden Oktoberfest Celebration committee and has been a Golden Civic Foundation board member since 1984 and served as the president in 1987. Kay was also the mayor of the city of Golden from 1988-96 and was a member of the Golden City Council from 1986-88.

A national search for Kay's replacement has begun.

FOOTBALL: The Orediggers are just 2-4 on the season, but have shown signs of improvement from years past as they have hung tough with the teams in the upper echelon of the Rocky Mountain Athletic Conference. Mines, which has posted wins over Western New Mexico and Missouri Rolla, is being led by junior Chad Frieauf who has thrown for more than 1,400 yards and 10 touchdowns. Sophomore linebacker Jared Heath has registered 62 tackles and is among the national leaders in that category.

VOLLEYBALL: After winning just one match last season, Mines has posted a 6-12 mark through 18 matches this season. Perhaps the best win of the season was a convincing 3-0 triumph at Mesa State, the preseason favorite in the RMAC West Division. Senior Lauren Ramsay leads the team in kills (193) and blocks (73), while senior Sonia Hesselstine has posted a team-best 255 digs, 144 kills and 11 aces. She was also named to the Clash in the Foothills All-Tournament Team.

SOCCER: Mines has posted a 5-8-1 mark this season. Each match has been closely contested. Six of the losses have been by one goal, while another loss was by two goals. On the other hand, three of the Orediggers' five victories have come via shutouts. Senior Jared Peacock leads the team with eight points, while senior Robbie Williams, junior Justin Buck and sophomore Mike Dixon have six points apiece.

CROSS COUNTRY: The Mines cross country teams have been extremely competitive in their races this season and competed at the RMAC Championships on Oct. 25 in Alamosa. The CSM women, ranked 10th in the region earlier this season, have been led by super sophomore Heather Beresford, while senior Derek Hudson has paced the men's squad.

ON THE NET: Now you can get all the latest and most comprehensive news on Oredigger football and Colorado Mines athletics 24 hours a day by visiting the Colorado School of Mines Athletic Department's official website at <http://athletics.mines.edu>.

JOIN THE OREDIGGER E-MAIL LIST: Get all the latest news on all of Colorado Mines Athletics by signing up for the Orediggers' E-Mail List. Receive daily updates, game recaps and press releases on all of Mines' athletic teams by e-mailing Sports Information Director Greg Murphy at gjmurphy@mines.edu. Please indicate in your e-mail which sport reports you want, or if you want to receive news of all sports.

Beckley '85 Turns Hobby into Business

By Heather McGregor

Steve Beckley BSc Pet '85 always wanted to own a commercial cave, a place where he could take people underground and show them the wonders he discovered as a hobby caver. "I thought it would be neat to have something for people to come and see to enjoy themselves in a natural environment," Beckley said.

In 1998, his dream began to come true when a door of opportunity opened at the historic Fairy Caves in Glenwood Springs, Colo. By then, he shared the dream with his wife, Jeanne.



Beckley had spent years pestering Denver resident Pete Prebble, who owned the Fairy Caves property, to give him a chance to enter the mysterious caverns. Prebble bought the caves property in 1960 with the intent of reopening them as a tourist attraction. He never pulled it off, but closely guarded the caves.

In 1992, Prebble agreed to let the couple enter the cave. Accompanied by a Texas caver hand-picked by Prebble, the two entered the Fairy Caves and made their way to Jam Crack, which at the time was the only way to get down to the vast network of undeveloped caverns in Iron Mountain. Jam Crack is a

vertical opening in the limestone, 30-feet deep and about 8.5 inches wide. The three cavers inched their way down the crack, so narrow they couldn't even turn their heads. "You make a commitment, left or right, and then you go down," Beckley said.



This was Jeanne Beckley's second time caving and she nearly lost her nerve. But the Texas caver convinced her that Jam Crack was the worst spot, and everything else would be fine. "He lied to me," she said with a laugh, remembering the rest of the route. "It took us three hours to get from the entrance down to the Barn; it turned into a 10-hour caving trip." But the strain was worth it. "It was so incredibly beautiful," she said. They saw the Barn, a huge cavern embellished with thousands of soda straw stalactites, flowstone, cave bacon and glowing stalagmites. And they went farther down to see King's Row – now the end of the developed tour – a garden of stalagmites.

"We came back to Denver and made a pact," Jeanne said. "We do a lot of things by fate. We said if Pete ever signs a lease, we'll quit our jobs, move over to Glenwood and do this." They didn't leave Prebble's decision to fate, however. Over the next several years, they nurtured a friendship with Prebble and his wife. And in 1998, Prebble offered to lease the caverns to the Beckleys.

With the help of friends, they worked for months turning the caverns into a space that could be visited by ordinary people. They drilled a new entrance with airlock doors and installed a boardwalk and 127-step staircase and landings so people could walk down. They reworked the century-old electric lighting system to be safe and subtle. On Memorial Day weekend in 1999, they opened the caves for the touring public.

Every day from May to October, tour buses drove groups up the narrow, twisty and steep road on the west side of Iron Mountain to reach the cave entrance. That first year, 30,000 people toured the caverns. During winter and early spring, the road was simply too dangerous for the tour buses so the caverns closed in the winter. But with the recent opening of the Iron Mountain Tramway, a joint project of the Beckleys and another Glenwood Springs couple, the caverns are now open year-round. With a

tramway, a mountaintop restaurant and gift shop, trains, an observatory, a children's discovery center and the caverns offered, they changed the name of the tourist attraction to Glenwood Caverns Adventure Park.

"We always wanted to show people what you can see in a cave, but in most caves you're crawling through tight spots," Jeanne said. With these carefully developed caverns,

visitors don't even get their shoes dirty. But they come away with a smile, which pleases the Beckleys.

Reprinted with permission from the Glenwood Springs Post Independent.

Luengo '85 Builds Hydro Plants in Guatemala

Javier Luengo BSc Pet '85 is a consultant in the hydroelectric field working mostly on new projects in Guatemala. "I have experience designing, building and operating hydro plants," he says. "During the pre-feasibility and feasibility studies it is normal to meet with the local villagers and authorities on a regular basis."

The power plant Luengo is currently working on will provide local villagers with jobs in addition to power. All the projects I have been involved with are private. "Other benefits are greater sales of goods during construction, transportation to and from the sites to the near villages, consumption of goods and services from nearby towns and villages and housing rentals," says Luengo. He has seen communities improved by new roads and bridges being built and community lighting installed.

"Being a petroleum engineer, this field of work is totally different for me," Luengo says, "but my Mines engineering degree has helped me during the years in different fields of work." In the five-plus years Luengo has been involved with hydro plants, he has traveled to Switzerland twice (where he snow skied), Canada, the United States, Mexico, Costa Rica, Honduras, Colombia and a variety of sites in Guatemala.

"Searching for oil and producing it, which I did years back, is very interesting," he says, "but what I really like of the field I'm in now is that the energy is clean and friendlier with the environment!"

Events calendar

November	December	January	March
<p>13 Golden, Colo., Lunch Bunch: second Thursday of every month. An informal alumni get-together meets at the Buffalo Rose in Golden, Colo., 11:30 a.m. Denver Mixer: second Thursday of every month. Wyncoop Brewing Company, 1634 18th Street, Denver, 5-7:30 p.m. No charge at door, pay own way.</p> <p>20 Grand Junction, Colo., section luncheon: third Thursday of every month. At Bookcliff Country Club, 2730 G Road, noon. For information call John Howe at 970-242-4903 or Del Tolen at 970-256-1118.</p>	<p>05 Houston Luncheon. Details TBA.</p> <p>11 Golden, Colo. Lunch Bunch (see Nov. 13 for details). Denver Mixer (see Nov. 13 for details).</p> <p>18 Grand Junction, Colo., section luncheon (see Nov. 20 for details).</p>	<p>15 Houston Happy Hour: Outback Pub, 5:30 p.m. 3100 Fountainview at Richmond Ave.</p> <p>18 Grand Junction, Colo., section luncheon (see Nov. 20 for details).</p>	<p>11 Golden, Colo. Lunch Bunch (see Nov. 13 for details). Denver Mixer (see Nov. 13 for details).</p> <p>18 Grand Junction, Colo., section luncheon (see Nov. 20 for details).</p>
	<p>January</p> <p>08 Golden, Colo. Lunch Bunch (see Nov. 13 for details). Denver Mixer (see Nov. 13 for details).</p> <p>15 Grand Junction, Colo., section luncheon (see Nov. 20 for details).</p>	<p>February</p> <p>12 Golden, Colo. Lunch Bunch (see Nov. 13 for details). Denver Mixer (see Nov. 13 for details).</p> <p>19 Grand Junction, Colo., section luncheon (see Nov. 20 for details).</p>	<p>April</p> <p>08 Golden, Colo. Lunch Bunch (see Nov. 13 for details). Denver Mixer (see Nov. 13 for details).</p>

For the most up-to-date information on what's happening, check the website at www.alumnifriends.mines.edu and click on "News and Events" (top of page). Scroll down to the calendar.

Mines Annual Fund



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of Mines
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- Making a pledge online: <https://www.oia.mines.edu/give/>,
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Alumni notes & quotes

Edwards '61 Retires After Long Mines Career

Glen R. Edwards Met E '61, a professor of metallurgical engineering and co-founder of the Center for Welding Research (now the Center for Welding, Joining and Coatings Research – CWJCR), has retired from CSM. Edwards worked for Los Alamos National Laboratory while studying for his master's degree in materials science. He also earned a Ph.D. from Stanford University in 1971.



Edwards began his career at Mines in 1976 and was a full professor by 1979. He has devoted the last 27 years to course development, materials research and both undergraduate and graduate education. He helped found the CWJCR in 1982 and assumed directorship in 1987.

Strack '81 Wins Achievement Award

Dr. Kurt M. Strack MSc Geop '81, president of KMS Technologies – KJT Enterprises located in Houston, has received a Distinguished Technical Achievement Award for 2003 from the Society of Petrophysicists and Well Log Analysts, during its annual conference June 24 in Galveston, Texas. Strack's company specializes in borehole logging tool and permanent sensor development. He serves as an adjunct professor in the geosciences department at University of Houston where he teaches borehole geophysics.



Two Named to Mining Hall of Fame

George O. Argall Jr. EM '35 and Russell L. Wood EM '49 were inducted into the National Mining Hall of Fame in Leadville, Colo., in September. Argall (1913-2002) was an internationally famous mining engineer, technical editor and publisher. During his career he visited and reported on mining operations in 66 nations. He took special pride in getting a story right. On his typewriter, Argall taped three words so he could always see them: accuracy, accuracy, accuracy. As a youngster, Argall went to school in the building that is the core of the National Mining Hall of Fame and Museum in Leadville.



George Argall



Russ Wood

Wood (1927-2001) was a consummate mining engineer. He was dedicated to learning and to the use of new technology. He generously used his resources for the benefit of CSM and the communities in which he lived. His relationships with laborers and leaders of industry were sound, good-natured and successful. Wood served on the School's Board of Trustees for 15 years including seven as president.

Each year, the Mining Hall of Fame selects men and women who pioneered the discovery, development and processing of our nation's natural resources to add to its roster. This year's group included six people bringing the total honored to 179.

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Mines Acknowledges Individual Donations

Colorado School of Mines received gifts of \$25,000 or more from the following individuals between March 21 and August 31, 2003. Acknowledgements for corporate and foundation gifts since the last issue of *Mines* will be included in the winter issue.

Jerome '64 and Becky Broussard completed their *Transforming Resources* campaign pledge with a payment of \$50,000. This gift supports scholarships for students in the Engineering and Technology Management master's degree program.

Holland Coors made a gift of \$25,000 to support the Advanced Coatings and Surface Engineering Laboratory in the Department of Metallurgical and Materials Engineering.

A gift of \$355,937 from the estate of **James D. and Allis V. Corbett** was used to establish a trust that will endow scholarships for students in Petroleum Engineering.

With a *Transforming Resources* campaign pledge of \$200,000 and a subsequent payment of \$50,000, **Fred Dueser '49** established an endowed scholarship fund to support undergraduate students who demonstrate strong potential for success.

Patrick J. Early '55 made an unrestricted contribution of \$50,000 to the *Transforming Resources* campaign.

Hugh W. '49 and Ann Evans donated appreciated assets with a value of \$101,919 to the Evans Charitable Remainder Trust.

Fred J. Hilterman '63 '70 and his wife Kathleen established the Hilterman Endowment Fund for Geophysics with a donation of \$50,000. The gift was in honor of Fred's 40th reunion year.

A bequest of \$75,000 was received from the estate of **Betty Kissinger** for the Bradley James Kissinger Memorial Scholarship. The scholarship honors Mrs. Kissinger's son, who was a student at Mines at the time of his death.

Robert Maytag donated \$261,429 to fund the Andes Scholarship Program, which Mr. Maytag established in 1989. The program enables students from the Andes region of South America to attend Mines.

Rob '68 and Ann McKee contributed \$44,428 to the McKee Family Endowed Scholarship Fund, which provides financial aid to Mines students participating in varsity athletics.

Dedicated supporter **Jim Mulryan '54** made his annual Guggenheim Society level

gift just before his untimely death in May. As he did every year, he directed his gift to his endowed scholarship fund and to the Mines Annual Fund.

William A. Preston '58 renewed his membership in the Simon Guggenheim Society with a gift of \$25,000 to the Renewal Fund, a scholarship endowment.

Don Thorson '55 enhanced his Senior Design Endowed Fund with a generous gift of \$100,000. The Fund helps support

projects in the Engineering Senior Design course.

The Professor Robert Thompson Memorial Award Fund now exceeds \$75,000, thanks to a challenge from Thompson's close friend **John Wright '69 '85**. Wright's goal was to triple the fund by offering to match contributions dollar-for-dollar up to \$25,000. Wright was pleased to submit a check for \$25,000 in June 2003 and thanks the Mines community for their role in making it possible.

Mines Remembers James D. Mulryan '54

Colorado School of Mines is saddened by the loss of long-time friend and distinguished alumnus, James D. Mulryan. A 1954 Mining Engineering graduate, Mulryan was a retired independent minerals consultant who, until 1985, worked for Cyprus Industrial Minerals Company as a production manager, manager of safety and land development, and administrative supervisor of exploration.

Jim was also one of the School's most devoted benefactors. He was a charter member of the Simon Guggenheim Society of the President's Council, which recognizes individuals who make annual contributions of \$25,000 or more to the School. Jim contributed at this leadership level each year since the Society's inception in 1996-97. Jim was also a member of the Mines Century Society, honoring his total lifetime giving of over \$300,000 to the School.

In 1992, Jim generously established The James D. and Lois H. Mulryan Endowed Scholarship in Mining Engineering to provide financial aid for needy and deserving undergraduates majoring in Mining Engineering. Since then, the scholarship has made 29 awards, enabling 19 talented students to attend Mines.

Jim contributed his time to Mines as well. He served on the Special Gifts Committee of the RESOURCES Campaign; was a member of the Class of 1954 Reunion Gift Committee in 1989; and chaired the reunion gift committee in 1994. He also served on the School's Alumni Association Board of Directors from 1988 to 1994.

Mulryan served his profession as a trustee of the Mining Engineers Foundation and his community as a member of the Littleton Lions Club. He will be fondly remembered by those who knew him at Mines, including the many students who have and will benefit from The James D. and Lois H. Mulryan Endowed Scholarship. *(An obituary for James Mulryan appears on page 39.)*



FRANK "RED" AUSANKA PE '42 died at his home in Santa Barbara, Calif., May 4. He was 89. After graduation, Ausanka served in the U.S.

Army Corps of Engineers in Burma during World War II. He was retired after suffering major hearing loss and was given hearing aids which he wore the rest of his life. Ausanka then became an independent oil producer beginning his career in California and moving to Wichita Falls, Texas, in 1949. He spent more than 50 years exploring and developing the oilfields of North Texas as Ausanka Oil Operations. He retired to Santa Barbara. Ausanka was a member of the CSM President's Council. He is survived by his wife of 60 years, Martha, three daughters and four grandchildren.



PAUL "RON" BETHURUM PE '54 died July 11 at age 77 in Denver after a long illness. He began his career in mining and mill processing with Susquehanna Western in South Dakota, Wyoming and Texas. Subsequently he held the positions of manager of Utah operations with Atlas Minerals in Moab, Utah; vice president of soda ash operations with Texas Gulf in Green River, Wyo.; and executive vice president of Pioneer Nuclear in Amarillo, Texas. Bethurum is survived by his widow, Mary Lou, three daughters and four grandchildren.



ROBERT L. BOLMER EM '44 of Grand Junction and Lakewood, Colo., died July 2 at age 82. Bolmer was born in Council Bluffs, Iowa, and graduated from Omaha North High School in Nebraska. He was an Eagle Scout and member of Sigma Nu fraternity as well as a member of the Society of Mining Engineers and a lifetime member of CSMAA. During World War II he served in

the U.S. Navy in Japan. In 1948, he married Charlotte E. Kienhoff. Bolmer worked in the field of mining engineering all of his life. His first job was as a mucker for U.S. Mine in Bingham Canyon, Utah. He also worked as a foreman/safety engineer for New Jersey Zinc Co. in Gilman, Colo. Bolmer was a mining engineer/superintendent from 1949-1981 for the U.S. Bureau of Mines in Lakewood, Colo. In 1990, he and his wife retired to Battlement Mesa, Colo., in the heart of western Colorado's oil shale area that he loved. The couple moved to Grand Junction in 2002. Bolmer enjoyed hunting, fishing and photographing the Colorado mountains, as well as spending time with his family. He is survived by his widow, son Robert S. BSc Pet '77, two daughters, three grandchildren, a sister, two nieces and a nephew.

ERNEST "ERNE" E. BURGH EM '44 died July 17 in Bella Vista, Ark. He was 81. Burgh spent his childhood in Alaska and was a member of the Bering Straits Native Corporation. He was one of the first Alaska natives to pursue a college education and persuaded others to do the same. After graduation from Mines, Burgh served in the U.S. Navy during World War II. After the war, he worked for the U.S. Bureau of Mines west of Rifle, Colo., developing a low cost, high production, underground system of mining oil shale for recovery of the oil by retorting. In 1930, he joined Mississippi Lime Company in Missouri, returning to Colorado in 1955 to work again in oil shale development and as a mine consultant in uranium operation. In 1957 he was



appointed assistant superintendent at the Thornton Quarry in eastern Illinois for Material Service Company, at the time, the largest commercial quarry in the country. He returned to oil shale in Colorado before joining Marble Head Lime as superintendent at the lightweight aggregate plant in Ottawa, Ill. He retired in 1987 as vice president of operations. Following retirement he worked as a consultant for a number of years before devoting his time to fishing, golf and hunting. Burgh is survived by his wife of 58 years, Mary Jane, a son, three daughters, six grandchildren and three great-grandchildren.

HILDRETH FROST JR. EM '39 died in Denver Aug. 7 from complications of pneumonia. He was 88. The son and grandson of miners, Frost also pursued a career in mining and metallurgy. He operated the Hiawatha Gold Mine in Cripple Creek from 1939 to 1942 and worked for the U.S. Army from 1942-1945. From 1945-1952 he was chief engineer for the Denver Equipment Company and supervised construction of the mill at the Pride of the West Mine. He also consulted on mining and milling operations in Mexico and Peru. He patented a new method for froth flotation and concentration of sulphide ores. He became a professor of metallurgy at CSM in 1953. In 1969, President Nixon appointed him to be the chief assayer of the U.S. Mint in Denver where he served until retirement in 1977. Frost was active much of his life in the Boy Scouts of America and was an Eagle Scout and a Brotherhood member of the Order of the Arrow. He was a lifelong member of the Grace Episcopal Church Mission. Frost is survived by his wife of 64 years, Doris, three sons, six grandchildren and five great-grandchildren. A fourth son predeceased him.



STEVEN M. GRUVER PE '82 died in a plane crash Sept. 2, 2002. The crash was the result of engine failure during takeoff in his Beachcraft Baron. Gruver's entire family and in-laws were in the plane and there were no survivors.



After struggling through Mines for over six years, Gruver graduated with the proud accomplishment of receiving the

Tippie & Vaughn scholarship for those that show potential but not necessarily academic excellence. In 1983, Gruver married Julie Coyle from Charleston, W.Va. They spent the next 20 years following the oil fields in Texas, Louisiana, Syria, Venezuela and Scotland while raising a family and pursuing their passions for water skiing and flying. They raised three active girls who enjoyed gymnastics, music, water skiing, dance and flying: Amanda 15, Sarah 13, Elizabeth, 13. At the time of their deaths, they resided in Lafayette, La. Gruver was vice president and general manager of the North American unit for ENSCO International Inc. His professional activities included SPE, International Association of Drilling Contractors, American Petroleum Institute, Global Drilling Safety Leadership Initiative and his local chamber of commerce. Gruver's positive "can-do" and supportive attitude touched many people through the oil industry. His friends and colleagues established a Mines scholarship in his honor. Gruver is survived by his parents, Henry PE '57 and Jan Gruver, a sister and brother, a nephew, two nieces and a grandmother.

DUKE HANSON, who attended Mines in 1977-78, died July 7 from injuries sustained in a car accident. He was 44. Even though we haven't forgiven Duke for being the world's all-time sloppiest roommate, we will miss him terribly. After graduating valedictorian from Glenwood Springs, Colo., High School, he spent his freshman year at CSM. He earned an electrical engineering degree from University of Colorado in 1982. Since then,

he worked for Motorola in Phoenix. Hanson was passionate about designing and building electronic gadgetry long before he ever got paid to do it. However, Motorola must have really hated his work because they kept ejecting it into space. Hanson designed radios for the Space Shuttle, and transponders and antennas for military and non-military satellites, including the Iridium global satellite system. Although Duke had the brainpower to be a world-class geek, he was blessed with a mischievous streak that overcame any nerdy temptations. We spent most Friday and Saturday nights cruising and street racing his Starsky-and-Hutchmobile. We also spent many great weekends at the discos seeking, but never finding, our dream girl. After losing several potential wives, we deduced that the surest way to end a conversation with a disco diva was to admit being a student at Mines. Within three months of arriving in Golden, we became "CSU students." Hanson leaves behind a wife and four daughters.

By Russell Law BSc Min '81, Robert Vincent BSc Pet '81, John Ehlers, Expatriate

CHARLES F. "CHAS" HARDING BSC PET '93 died June 1 from injuries sustained when a well head blew out and an object struck him. He was 33. Harding was born in Texas and moved with his family to Oklahoma in 1970. He was a petroleum engineer, a member of Kappa Sigma fraternity and the Society of Petroleum Engineers. In 1998, he married Kari Marie Anderson. When Harding died, his wife was pregnant with their second son. Harding is survived by his widow, two sons, his parents, five brothers and grandparents. "We will all miss Chas so much. He was a delight to know and work with," said friend David Peetom.

MARK F. HILLENBRAND BSC GEOL '77 died June 14. He was an applied technology teacher at Thunder Ridge Middle School in Newton, Kan. After graduation from Mines he completed his teaching certification in science education. He was married to Pam Schmidt. A memorial fund has been established that will support student

scholarships, invertebrate paleontological research projects and a permanent display of Hillenbrand's wildflower photography at the Presbyterian/St. Luke's Bone Marrow Transplant Unit.

JOSEPH ERNEST HOPKINS, who attended CSM for two years in the 1930s and was a great friend to the School, died May 21 at his home in Grand Junction, Colo. He was 89. Hopkins was a mining engineer born in Breckenridge, Colo. In 1928 he moved to Alaska with his family and ultimately graduated from University of Alaska in 1939 after having attended Mines. He worked as a gold panner on prospect drills and as a surveyor during summers before joining U.S. Smelting Refining and Mining. Later he worked for Union Carbide in Colorado, New Jersey, California, New York and Brazil. He was superintendent at the mine where uranium was first extracted for the atomic bombs used in World War II. He is survived by his wife of 64 years, Ellen, a son, two daughters, four grandchildren and four great-grandchildren.

AUGUSTUS LEE MOORE EM, '42, MSc MIN '46 died June 2 at his home in Chattanooga, Tenn. He was 83. Originally from Memphis, Tenn., Moore attended Mines after being awarded a Tennessee State Scholarship. While at Mines, he was a member of Sigma Alpha Epsilon. He was a veteran of World War II, serving as a bombardier with the 8th Air Force, 457th bomb group based in Glatton, England. Most of his engineering career was spent in the exploration, development and mining of raw materials for the aluminum industry in the United States, Caribbean, Central and South America, and Africa. He worked for companies including Alcan, Revere and Kaiser Aluminum, spending the final years of a long and interesting career at Tennessee Valley Authority. He retired in 1993. His son, James L., was killed in action in Vietnam in 1969. He leaves a daughter, Lisa M. Moore, and a sister, Jean M. Steadham.

JAMES DONALD MULRYAN EM '54 died May 20 in Littleton, Colo. He was 74. That day, SME lost a distinguished and dedicated member. Mulryan was an honor high school student, outstanding football and track athlete and president of his senior class. After two years at Stanford, he transferred to CSM. After graduation, he was a lieutenant in the U.S. Army Corps of Engineers. Mulryan spent his career in industrial minerals mining and processing. He began at U.S. Gypsum's Iowa operations, then joined Sierra Talc & Clay Company. In ensuing years, he was



operations manager for mining and processing and vice president of mines. Cyprus Mines Corp. acquired Sierra in 1964 and after overseeing the construction of a talc processing facility, Mulryan joined Pfizer's calcium carbonate mining operations. He returned to Cyprus in 1971 as manager of western operations with responsibility for 16 mines and mills in California, Nevada, Texas, Montana and Nebraska. In 1979, Amoco Corp. acquired Cyprus Mines and combined its metals, industrial minerals and coal operations into Denver-based Amoco Minerals where Mulryan was a key member of the engineering and exploration team. Throughout his life, Mulryan was a relentless recruiter for SME and was devoted to Mines academic and sports activities. He was an active member of CSMAA, established a Mines scholarship, and was a member of Silver and Blue. He was a trustee of the Western Mining Museum in Colorado Springs and was a dedicated member of the Littleton Lions Club. He is survived by a daughter, a son and four grandchildren. Although Jim's heart finally failed him, those of us who knew him will remember him for the strong and faithful spirit with which it beat. Jim was always a positive, outgoing, loyal friend and colleague. We shall miss him greatly.

By Henry T. "Joe" Mulryan

JOHN L. NEFF EM '53 died May 19 at age 73. After graduation from Mines, he worked at the Climax Mine in Colorado, then spent two years in the U.S. Army Counter-Intelligence Corp. Neff then taught engineering part-time at University of Washington while attending law school. He graduated from UW law school in 1958 and moved to Spokane, Wash., where he was a partner in Witherspoon, Kelly, Davenport and Toole, a partner in Neff, Nays and Witherspoon and successor firms, retiring in 2000. Neff was a life member and longtime secretary of the Northwest Mining Association. He was also an active member of Manito United Methodist Church and several other organizations. Survivors include his wife of nearly 50 years, Barbara, four daughters, five grandchildren and two step-granddaughters.



PATRICE TOBEY BSC PHY '85 died in April 2001 after a long illness. She was 36. After graduation from CSM, Tobey (also known as "Pat" and "Marshmallow") was an aerospace engineer with Hughes in Los Angeles. She is survived by her mother and brother. Tobey (center front) is shown surrounded by her best friends (front left) Annette Bills BSc CPR '87, Tobey, Gina Morrison BSc Geol '85; (back left) Peggy Mott BSc Phy '86, Lisa Cox BSc Math '87, Kathy Buess BSc CPR '86, Leslie Gawkoski BSc Math '86.



SAM E. WALTHALL PE '67 died Oct. 17, 2001 in the arms of his fiancée, Donna Riffle, at his home near Chidester, Ark. Walthall attended Southern Arkansas University for two years before transferring to Mines. He considered graduation from Mines to be the crowning and defining

event in his life and was an eloquent spokesman for his alma mater. After graduation, Walthall became an offshore drilling engineer in Alaska for ARCO. It was reported within the company that he was the first straight-out-of-college person to be sent directly to an offshore position. Walthall then moved to Dallas with SEDCO Drilling Co. (later merged with Schlumberger). He worked as an engineer in offshore drilling and later in platform design. He worked in the North Sea and the Gulf of Mexico. In 1992, Walthall was diagnosed with Parkinson's disease and retired. He is survived by one daughter and two sons. "Sam was the embodiment of CSM in that he believed that there was no problem too great to solve if you worked at it intelligently and tenaciously," says friend H. Joe Boyd PE '63, MSc Pet '69. "It was that attitude that brought him considerable international recognition as an offshore drilling engineer on both platforms and drill-ships."



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1948

William R. Smith PE, father of **Brian J. BSc Pet '85** and grandfather of **Erik D. BSc Eng '03**, has another granddaughter, Jennifer M. Rotramel, who plans to attend Mines next year.

1956

Thomas O. Mohr PE is owner/president of Mohr & Associates Inc. in Montrose, Colo.

1958

Donald G. Miller PRE is retired in The Woodlands, Texas.

1961

Kim de Rubertis Geol E worked with three other Miners on separate hydroelectric projects in the Pacific Northwest in May.



With Mike West Geol E '70.

Sierra Nevada Rendezvous

By John Sulzbach EM '56

For years, **Dave Mann EM '56** and I had lobbied **John Blomberg PE '56** to join us backpacking in the High Sierras. Now, finally, it was a reality. John, Dave, and I had been roommates and fraternity brothers at Mines. The fourth member of our expedition was Bill Elliott.

Day one, mid-August, was clear and sunny for the trek to Steelhead Lake where we camped at 10,500 feet. We enjoyed ramen noodles and freeze-dry fettuccine before dropping temperatures hastened our retreat to warm sleeping bags. Next morning we began the steady slog up a ridge and found ourselves peering over a sheer cliff with no discernable trail. We cautiously worked our way along a ledge on the vertical cliff face to descend, then bushwhacked north over timbered slopes. After lunch, we continued forcing a route through heavy timber on steep slopes before making the climb to Spiller Creek. Nearly out of energy and sunlight, we gratefully made camp.

Day three we were challenged by a long

ascent up steep switchbacks with two demoralizing false summits, then another long climb before dropping down into gentler terrain and a major trail junction. Over a streamside lunch we decided to continue up the valley with the likelihood of less-traveled trails. The trail was well defined at a gentle grade, so we hiked steadily for another two hours before camping at 9,200 feet. Dave and Bill fished, John birded, and I looked for artifacts until dusk. Bundling up, we enjoyed dinner around a campfire.

We woke to a frosty morning. The valley opened before us as we climbed toward the craggy pinnacles of Sawtooth Ridge. Snowfields on the northern slopes fed melt streams that crossed our trail. The grade was reasonable, but after two



Descending Horse Creek Pass, Bill in lead, followed by Dave and John B.

MSc Geol '77 (left).



With Omar Fulton BSc Min '98 (right).



With Mike Morgan BSc Eng '88 (left).

1962

Wendell E. Cloepfil Geol E is retired in Portland, Ore.

1964

Ronald B. Mellor PE is a field manager for Niko Resources Ltd. in Surat, India.

1965

Larry J. Hoppe Met E is an

independent consultant in Mica, Wash.

1966

Richard E. Hague Geop E, MSc Min '70 is retired in Breckenridge, Colo.

Robert W. Warning Met E is manager of grinding media sales for Border Steel in El Paso, Texas.

1969

Abelardo A. Cruz PRE is retired in Caracas, Venezuela.

John D. Wright BS Pet, PhD Pet '85 is president and chief engineer at Questa Engineering Corp in Golden, Colo. Questa Engineering has merged with Norwest Corp. of Salt Lake City and Calgary, Alberta, to create one of the world's most fully integrated energy consulting firms. This team will offer unmatched expertise in coal, petroleum, natural gas, coalbed methane, oil sands, and mineral resources. Questa:

www.questa.com and
www.norwestcorp.com.

1970

Lee Moore Jr. Geol E is senior seismic processing consultant for Exploration Consultants Ltd. in England.

1971

Ralph Baird BSc Geop has a



new granddaughter, Jordan Lynn.

1972

Samuel C. Prutch BSc CPR is production superintendent for Mewbourne Oil Co. in Hobbs, N.M.

1973

William H. Borland BSc Geop is a principal geophysicist for Schlumberger Ltd. in the United Arab Emirates.

1974

Takashi Ohya PhD Geop is

retired in Tokyo.

1975

Theodore S. Allen III BSc Pet is a petroleum engineer for Allen Engineering in Edmond, Okla.

George W. Matthews BSc Min is plant manager for U.S. Silica in Mill Creek, Okla.

Andrew P. Schissler BSc Min, PhD Min '02 is an assistant professor at Penn State University.

1976

Julie H. Smith BSc Geol is president of International Business Strategies in Golden, Colo.

1977

Randy D. Roberts BSc Geol is administrative director for Academy Corporate & Personal Services in Cañon City, Colo.

Thomas W. Windle BSc Geop is a software engineer for LXE Inc. in Duluth, Ga.

1978

Michael R. Tolliver BSc Min is

retired in Farmington, N.M.

1979

Joseph D. Achierno BSc CPR is a site leader for Dow Chemical Co. in Malaysia.

Steven A. Jensen BSc Geop is vice president of research and development for GeoCenter in Colorado Springs, Colo.

1980

Collin R. Fay BSc Min is president of ACEi in Grand Junction, Colo.

Philip O. Johnson BSc Pet is operations manager for the U.S. Energy Corp. in Riverton, Wyo.

Bryan Vaughn BSc Met has been promoted to division manager, sheet products, at U.S. Steel.

Catherine V. Woldow BSc Geol, MSc Env Sc '90 is an environmental health and safety specialist for University of California at Santa Cruz.

1981

Charles E. Huffaker BSc CPR is

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a supply chain specialist for TransMontaigne Inc. in Denver.

Amy L. Peterson BSc Geop is a TPF systems programmer for IBM Global Services in Denver.

1982

Matthew T. Berghorn BSc CPR is project manager for ForeRunner Corp. in Denver.

Judith L. Bolis BSc Min, MSc Env Sc '92 is a mining and environmental engineer for AKA PROS Inc. in Denver.

Pablo Hadzgeria Jr. BSc Pet '82, P.E., is senior reservoir engineer for the Chesapeake Energy Corp. in Oklahoma City.

Timothy L. Hermann BSc Geol is senior operations engineer for XTO Energy Inc. in Fort Worth, Texas.

Kevin Stank Richards BSc Geol is a civil engineer for the Federal Energy Regulatory Commission in Chicago.

Henryk C. Szymanski BSc Pet is a petroleum engineer for the Bureau of Land Management in Denver.

1983

Glen J. Lesnick BSc BE is a project manager for Swales Aerospace in Torrance, Calif.

Brian J. Lindsey BSc Geop is Gulf Coast exploitation manager for Kerr-McGee Oil & Gas Onshore LLC in Houston.

Michael A. Scherrer BSc Geop is president and co-founder of Focus Exploration LLC in Houston.

1984

Jeffrey S. Childs BSc Pet is a project director for BP Plc. in London.

Craig A. Fulton BSc Min is a commander for the U.S.

Navy at Supreme Headquarters Allied Powers



Europe NATO in Belgium.

Jeffrey P. Lee BSc Geop is commander of the Indianapolis Recruiting Battalion for the U.S. Army.

Paul R. Onsager BS Pet, MS Pet '97 is vice president and senior reservoir engineer at Questa Engineering Corp in Golden, Colo.

Questa is merging with Norwest Corp. of Calgary, Alberta, to create one of the world's most fully integrated energy consulting firms. This team will offer unmatched expertise in coal, petroleum, natural gas, coalbed methane, oil sands, and mineral resources. Questa: www.questa.com and www.norwestcorp.com.

1985

John W. Anthony BSc Geol, M Eng Geol '88 is lead scientist for Mitretek Systems in Denver.

William M. J. Feldman BSc Pet is senior staff satellite systems engineer for Lockheed Martin in Boulder, Colo.

Steven D. Nash BSc Pet is a senior staff engineer for the Anadarko Petroleum Corp. in Houston.

Frederick H. Seymour Msc Math is a CSM graduate student.

Brian J. Smith BSc Pet is director of the Denver Basin operation for Kerr-McGee in Evans, Colo.

1986

Mark A. Degenhart BSc Pet is executive vice president for Perenco LLC in Houston.

1987

Wade A. BSc Pet, MSc Pet '93 and **Karen C. Bard MSc Pet '92** are consultants in Indonesia.

Douglas H. Brown BSc Min, MSc Min Ec '92 is vice president of business development for NovaGold Resources Inc. in Vancouver, B.C.

1988

Meredith A. Bond BSc Phy is a senior environmental engineer for

the U.S. Fish and Wildlife Service in Denver.

Charles C. McConnell BSc Pet is senior engineer for the Southern Star Central Gas Pipeline in Owensboro, Ky.

Nancy Kathleen Roldan BSc Geop is senior geophysicist for Kerr-McGee in its onshore division in Houston.

John C. Stites BSc Eng is a construction engineer and manager for the Forest Service in Delta, Colo.

1989

Linda N. Bliss BSc Chem is a department supervisor for Corning, Inc. in North Brookfield, Mass.

1990

Brad Davis BS Pet has joined Questa Engineering, an international consulting firm located in Golden, Colo., as a reservoir engineer. www.questa.com

Jeffrey D. Kitman BSc Min, P.E., is a financial adviser for U.S. Bancorp Piper Jaffray in Denver.

Duane J. Maue BSc Eng is a business manager for Dynegy in Houston.

1991

Daniel G. Constance BSc Chem graduated from St. George's University School of Medicine and is a physician in Flint, Mich.

Meftun Erdogan MSc Min Ec, PhD Min Ec '96 is principal consultant for the Landmark Graphics Corp. in Houston.

John D. Jensen BSc Eng is regional coordinator for ConocoPhillips in Calgary, Alberta.

Eric S. Olson BSc Met is a systems engineer for the town of Vail, Colo.

Barry A. Thomas BSc Pet is a student at Bethel Seminary and an intern minister in South Barrington, Ill.

1992

Vicky Jackson Nielsen BSc Pet

and husband Erik announce the



birth of Jackson Connor Nov. 6, 2002. Vicky is project engineering manager for WellDynamics in Houston.

Mark S. Morgan BSc Eng is director of engineering for the People's Electric Cooperative in Ada, Okla.

E. Hugo Vieytes MSc Geop is a senior geophysicist for ENAP - Empresa Nacional del Petroleo in Santiago, Chile.

1993

Kelly BSc Pet and Sara Brown



BSc CPR have a new son, Deklan.

Kirsten W. Dickhut BSc Geol is an environmental consultant for The SI Group in Cincinnati, Ohio.

King Foo BSc CPR, MSc CPR '95 and **Koon Eiong Tan BSc Min '94, MSc Min '97** announce the birth of Justin Kanglin Tan, born Nov. 23, 2002. Koon is a products trader for Statoil Marketing & Trading (U.S.) Inc. in Stamford, Conn.

Thomas M. Grimaldi BSc Eng, MSc Eng & Tech Mgmt '02 is chief executive officer for Accelgent, LLC in Golden, Colo.

Jerry Naranjo BSc Eng is vice president/general manager of Naranjo Civil Constructors Inc. in Greeley, Colo.

1994

Andrew N. Liffing BSc Min is

a captain in the U.S. Army at Fort Irwin, Calif.

1995

Kenneth A. Bates BSc Phy is a senior process engineer for Intel in Hillsboro, Ore., developing a module for Intel's next generation microprocessor chip.

Maria Angela Capello de Passalacqua MSc Geop is general manager for PDVSA in Caracas, Venezuela.

Jeffery C. Dillon BSc Eng is an advanced services engineer for Smith International in Midland, Texas.

Amy N. Flammang BSc CPR is a high school science teacher in Gypsum, Colo.

Leslie A. Hamilton BSc CPR is division manager for the Zia Natural Gas Co. in Ruidoso Downs, N.M.

Saskia Hoffer BSc Chem is on the technical staff at Sandia National Laboratories in Albuquerque, N.M.

D. Edward Settle BSc CPR is director of Renewable Investments LLC in Golden, Colo.

1996

Kegan J. Baird BSc Eng is a teaching assistant at CSM.

Robert D. Carlson BSc Eng received his MBA from University of Chicago and is an associate for United Airlines.

Dan Huber BSc Eng and Carrie



Olson are engaged and will marry in July.

Min J. Pongklub BSc Pet is human research manager for WMS Gaming in Waukegan, Ill.

Andrew C. Schneider BSc Eng, P.E., is an engineering inspector for INSPECTRUM in Evergreen, Colo.

1997

Morrakot Khebhareon MSc Math, PhD Math & Comp Sci '03 is on the science faculty at Chiang Mai University in Thailand.

Aaron R. Ochsner BSc Eng is a design engineer for Consolidated Metco Inc. in Portland, Ore.

Katherine F. Osmanson BSc CPR is a nuclear engineer for Naval Sea Systems Command Puget Sound Naval Shipyard in Bremerton, Wash.

Benjamin Panfalone BSc Eng is a financial representative for Northwestern Mutual in Boulder, Colo.

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Jennifer A. Van Dinter BSc Geol is director of investor relations and manager of corporate planning for Young Innovations Inc. in Chicago.

1998

Brandon K. Ahrens BSc Eng is a manager for Accenture in Reston, Va.

Lindsey C. Cooper BSc Math is a software engineer for Sybase in Englewood, Colo.

Thomas A. Hager BSc CPR and Angela S. Hutchinson BSc Eng '03 have married.

Jennifer A. Hudson BSc CPR received a chemical engineering master's degree from Washington State University in May and now works for Stewart Environmental Consultants Inc. in Fort Collins, Colo.

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Kendra LupPlace BSc Eng and



husband Adam announce the birth of Annabelle Mary, May 8.

Patrick M. MacCarthy BSc Eng is manager of J&J Programs for Med Source Technologies in Bethlehem, Pa.

Eric J. Prieve BSc Eng is a professional engineer for the Colorado Department of Transportation in Denver.

1999

Alfredo A. Chambilla Quispe M Eng Min is a mining engineer for Glencore in Lima, Peru.

Vanessa A. Davies-Pappas BSc Math & Comp Sci, MSc Math & Comp Sci '01 is a research analyst for the Southwest Research Institute in San Antonio, Texas.

Edna A. Faamao BSc Eng is an electrical engineer for CH2M Hill Inc. in Bellevue, Wash.

Alexander Fairbanks BSc Met & Mat Eng is a senior metallurgist for Fansteel - California Drop Forge in Los Angeles.

Janice M. Gossman BSc CPR is a chemical and environmental engineer for Earth Tech in Denver.

Robert D. Gossman BSc CPR is a process engineer for Optera Colorado Inc. in Longmont, Colo.

Marcus W. Lathrop BSc CPR is a staff engineer for Environmental Resources Management in Pittsford, N.Y.

Georgeanna Nugent MSc Env



married Greg Lynch June 29, 2002.

The couple met at State University of New York Plattsburgh. They currently reside in Denver and have one son, Ripley. **Gwen Christiansen MSc Env** was the maid of honor.

John S. Oakey MSc CPR, PhD CPR '03 is president and CEO of Metafluidics Inc. in Golden, Colo.

Andrew L. Olson BSc Geop is a captain in the U.S. Army Corps of Engineers at Fort Leonard Wood, Mo.

Gordon L. Olson MSc Pet is president of Wind River Consultants LLC in Lakewood, Colo.

Preecha Termsuksawad MSc Met & Mat Eng, PhD Met & Mat Eng '03 is a lecturer and researcher at King Mongkut University of Technology in Bangkok, Thailand.

2000

Jody B. Funk BSc Eng is a masonry specialist for CEMEX in Denver.

Shane T. Gagliardi BSc Pet is a project engineer for Evergreen Resources, Inc. in Wasilla, Alaska.

Travis Helms MSc Geochem and his wife Shelli had twins, Elijah and Jonah, in May. They join older brother, Caleb, who is 3. Helms is a petroleum geologist in Lafayette, La.

Vanessa L. Henderson BSc Geol is an environmental safety and health coordinator for the Colorado Springs, Colo., airport.

Daniel J. Larkin IV BSc Eng is an engineering assistant for Lennon Smith Souleret Engineering in Coraopolis, Pa., and a student at Trinity Episcopal School for Ministry.

David E. Petrick BSc CPR, MSc CPR '01 is a thermal engineer for Technology Applications Inc. in Boulder, Colo.

Sally J. Rautio BSc Pet is a completions engineer for Kerr-McGee Oil and Gas in Houston.

Arman A. Tulegenov BSc Pet is a production engineer for Agip Kazakhstan North Caspian Operating Company NV.

2001

Mohammed Saif Al-Nuaimi BSc Pet is a reservoir engineer for Dolphin Energy Ltd. in Abu Dhabi.

Arthur B. Brown BSc Min is a territory sales engineer for Scandura Conveyor Belting in Durango, Colo.

Eric-Paul Couture MSc Min Ec is pursuing a Ph.D. in economics at McGill University in Montreal.

Gabriel J. D'Arthenay BSc Pet is a production engineer for Williams Production RMT Co. in Gillette, Wyo.

Samuel L. Handsborough BSc Chem Eng is a process and project engineer for ConocoPhillips in Mertzton, Texas.

Jeremy K. Lee BSc Eng is a field engineer for Granite Construction Co. in Raleigh, N.C.

Kerry L. Petranek BSc Econ is district operations coordinator for Eaton Cutler Hammer in Austin, Texas.

Nathaniel R. Walker BSc Eng is a quality engineer for ATK Thiokol Propulsion in Promontory, Utah.

2002

Michelle L. Aikman BSc Chem Eng is an engineer for Florida Forensic Engineering Inc. in Largo, Fla.

Daniel S. Benedict BSc Pet is a MWD engineer for Baker Hughes INTEQ in Broussard, La.

Heather E. Booker BSc Eng is a petroleum engineer for ChevronTexaco in New Orleans.

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Jessica J. Semmler BSc Geop is a staff engineer for VEI Consultants in Anchorage, Alaska.

Christopher G. Theel MSc Env Sc is a water quality researcher and scientist for the Colorado Department of Public Health and Environment in Denver.

2003

Ryota Abe BSc Eng is an electrical engineer for Electric Power Systems Inc. in Anchorage, Alaska.

Vanessa L. Aguayo BSc Chem Eng is a chemical engineer for the U.S. Bureau of Reclamation in Denver.

Mohammed N. Al-Khamis PhD Pet E is a petroleum specialist for the Saudi Aramco Co.

Ahmed Khaleefa Al-Neaimi BSc Pet is a junior reservoir engineer for the Abu Dhabi Marine Operating Co.

Laurie M. Alzheimer BSc Chem Eng is an engineer at Lockheed Martin in Denver.

Glenda J. Anderson BSc Chem Eng is a procurement quality engineer for ATK Thiokol Propulsion in Brigham City, Utah.

Laura Anderson BSc Eng and



John P. Gabrielson BSc Chem Eng were married June 21 in Evergreen,

Colo. **Adetayo Suleiman Balogun BSc Pet, BSc Econ** is a CSM graduate student.

Amy L. Bean BSc Geop is an engineering sales trainee for Ingersoll-Rand in El Cajon, Calif.

Michael J. Berry BSc Eng is a field engineer for the Kiewit Western Company.

James L. Brown BSc Eng is an attorney for Swanson & Bratschun LLC in Denver.

Wade T. Clerkin BSc Eng is a project engineer for Shell Pipeline Company LP in Houston.

Abigail L. Cochran MSc CPR is an engineer at the Puget Sound Naval Shipyard in Washington.

Benjamin L. Cohen BSc Pet is a staff engineer for Occidental Oil and Gas Co. in Bakersfield, Calif.

Bernadette M. DeCianne BSc Chem Eng is an analyst for Accenture LLP in Denver.

Sheresa D. Derks BSc Eng is staff engineer for Vector Colorado LLC in Golden, Colo.

Aaron K. Ecton BSc Eng is a pilot in the U.S. Air Force.

Matthew R. Ellsworth BSc Eng is a teaching assistant at Colorado State University in Fort Collins.

Britania N. Eustice BSc Eng is an electrical engineer for Jacobs Engineering Group Inc. in Golden, Colo.

Joshua B. Farber BSc Eng is a hospital engineer for the Department of Veterans Affairs in Cheyenne, Wyo.

Rebe J. Feraldi BSc Chem is a volunteer for the Peace Corps.

Tammy L. Foppe BSc Chem Eng is a reservoir engineer for Shell.

Matthew J. BSc Eng and Jennifer Cross Frary BSc Eng are civil engineering aids for Los Angeles County's department of public works.

Nicolas B. Frazier BSc Pet is a petroleum engineer for BP.

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Larry E. Hartman Jr. BSc Pet, BSc Econ is a reservoir engineer for the Unocal Corp.

Jennifer M. Harvey BSc Phy is a systems engineer for Northrop Grumman Mission Systems in Aurora, Colo.

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Rachel M. Holland BSc Geol is a mudlogger for Pason Systems in Colorado Springs, Colo.

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James E. Johnson BSc Eng is a mission control flight controller for

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NASA at the Johnson Space Center in Houston.

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John H. Pfahl BSc Eng is a staff engineer for MFG Inc. in Wallace, Idaho.

Monte K. Richard BSc Eng is a field engineer for Sturgeon.

Maggie Roderick BSc Chem Eng married **Dale Clark BSc Eng**



'02 May 17. The couple resides in Woodinville, Wash.

Nicholas J. Rogers BSc Eng is a construction engineer for the Kansas Department of Transportation.

Nathan K. Rothe BSc Eng is an environmental engineering associate for the Lockheed Martin Corp.

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Joseph V. Sikorski BSc Econ is a platoon leader in the U.S. Army.

David E. Simon BSc Eng is an engineer for Perceptek Inc. in Denver.

Keith P. Swedhin BSc Eng is a field engineer for Kiewit Western.

Jared R. Thompson BSc Econ is an estimator for ABCO Contracting in Denver.

Jennifer K. Thompson BSc Met & Mat Eng is a research engineer for the Johns Manville Corp. in Denver.

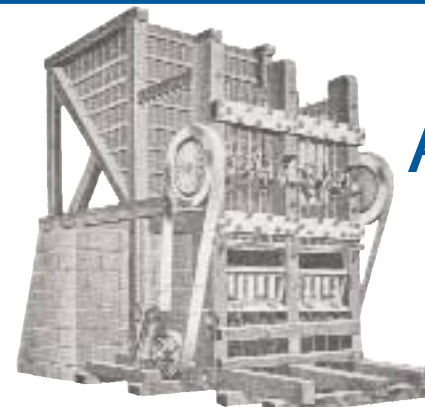
Eric M. Valencia BSc Math & Comp Sci is a software engineer for Northrop Grumman.

Michael R. Webb BSc Econ is a surface warfare officer in the U.S. Navy.

Kristi M. Wickman BSc Chem Eng is a naval architect for the Puget Sound Naval Shipyard in Bremerton, Wash.

Jordan R. Wiens BSc Eng is an electrical reliability engineer for Exxon Mobil Corp. in Torrance, Calif.

Mark R. Williams MSc Geol is vice president of exploration for the Whiting Petroleum Corp. in Denver.



A stamp mill like the CSM model.

Mike and Holly Blitstein of Buena Vista, Colo.

Archive Acquires Working Model of a 19th-Century Stamp Mill

Last year, the Russell L. & Lyn Wood Mining History Archive received a working model of a stamp mill, generously donated by

Stamp mills were used to crush ore into a fine enough grind so that precious metals could be liberated. Stamp mills were a significant improvement over arrastras that had been used since antiquity to grind ore. Stamp mills were used in China, not just to crush ore, but for crushing and milling rice. In Europe, stamp mills first appeared in the Middle Ages. By the Renaissance, stamp mills were well established in mining and milling operations in Germany and Bohemia.

A stamp mill is made up of pestles or stamps lifted by a cam from a power source, usually water or steam, but sometimes animal or human power. Once a pestle is lifted to a set height, it is dropped on ore placed below it. Each stamp assembly, with stem, tappet, bosshead and shoe, weighed between 500 and 1,300 pounds. The sheer weight and force of the stamp assembly falling crushed the ore. The assemblage of pestles used to crush the ore was called a battery, with usually three to five stamps per battery. As ore was crushed, water discharged it through screens onto copper amalgamation plates. Mercury painted on the copper attracted the gold or silver forming an amalgam that could later be recovered through a retorting process. Heating the amalgam during the retorting process vaporized the mercury, which was carried away as a gas to be condensed back into liquid form for use again, leaving the gold or silver.

The German stamp mill was adopted in Britain and became known there as the Cornish gravitation stamp mill. It eventually found its way to the United States and was first used in 1829 in the Georgia Gold Rush and later in mines in Virginia and the Carolinas. When the 1849 California Gold Rush began, stamp mills soon followed. The first California stamp mills had wooden shafts and soft iron shoes and proved to be inefficient. Fortunately, all manner of people had flocked to California to seek their fortunes, including "Yankee mechanics." These mechanically inclined miners instituted a number of innovative design changes

including iron instead of wooden stems, cast iron instead of soft iron shoes, round shoes instead of square, and using curved tangential cams instead of straight ones. The California stamp mill or Quartz Mill as it sometimes was called was developed from practical experience in the California gold fields. It became the model used around the world as the standard ore-crushing machine. Even the Cornish eventually adopted it in the late 19th century after a great deal of resistance. Wherever it was used, the basic design was the same. The only differences were the weight of the shoes on the stamps, the distance the shoes fell to the anvil, and the order in which the stamps fell after being lifted. Most



The Agricola stamp mill is a precursor and a direct ancestor to the 19th century model at CSM.

stamp mills have a wooden frame made from heavy timber, but iron or steel frames are also found. Although stamp mills were heavy, they could be transported disassembled to a mining site and easily reassembled. They were used well into the 20th century but were eventually replaced by ball mills. Today only a few working stamp mills and working models survive in museums or as rusted ruins at old mining sites.

CSM's model is a California-style stamp mill manufactured in London by the Thames Mining Machinery Company Ltd., around 1890. The model is about 4 feet tall, 2 feet wide and 4 feet long, built to a scale of 8 to 1. Two batteries of stamps, with five stamps each to a battery, make 10 stamps in all. The

order in which the stamps fall varies by region and is determined by the type of ore being crushed. With this particular model the order is 1-3-5-2-4. This order was known as the homestake sequence in the United States and was also commonly used in South African mines.

Because the model has a stamp order used in South Africa it may have been manufactured as a working model made for export to that country where the British had extensive mining interests. It is likely the model was used in expositions and trade shows where the Thames Mining Machinery Company tried to sell its stamp mills throughout the British Empire. How it got to Buena Vista, Colo., is a mystery. Fortunately it did and was preserved until it could be donated to the Archive.

By Robert Sorgenfrei

Robert Sorgenfrei is librarian/archivist of the Russell L. & Lyn Wood Mining History Archive, Arthur Lakes Library.

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