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Dilbert Meets Jack Welch

The Woolsey Papers

by willy williams and mark twain thrown in for flavor

Dear fellow alumni,

As alumni, we take great pride in Mines’ reputation as a world-class school of engineering and science. We also have a stake in Mines’ ability to maintain its tradition of excellence! Active participation in our Alumni Association provides one of many opportunities for us to support these important traditions.

The School’s leadership has successfully maintained the Mines tradition for excellence, as evidenced by Kiplinger Magazine’s recent selection of Mines as one of the top 25 values for in-state public higher education in the United States. The Colorado legislature also recognized Mines’ unique status by designating it the state’s first “exemplary institution.”

E. Steven Mooney Geol E ’56, immediate past president of the Board of Trustees, eloquently summarized the reputation we value when he said, “There is a special character to a Mines education. Students develop problem-solving abilities, leadership skills and a strong work ethic. CSM continues to be internationally recognized for graduating professionals who are ready to work.”

Increased alumni involvement and support is vital to sustaining that tradition. To encourage more alumni involvement, the School and the Alumni Association have launched a new era of cooperation by entering into a joint operating agreement. This effort includes joint funding for alumni relations programs and the hiring of a new director of Alumni Relations. This agreement, discussed in the February issue of Mines, can be viewed online at www.csmaa.mines.edu/alumni.

All CSM graduates are now automatically members of the Alumni Association and receive Mines magazine. Despite this effort to keep in touch with all our alumni, the percentage of dues-paying membership has declined. The number of Mines graduates has grown by approximately 6,000 over the past 10 years to about 20,000 living members, but the number who become “active” or “sustaining” by paying annual membership fees has not reflected that growth. The resultant flat revenue stream has placed significant pressure on our ability to effectively support the School and our alumni. In addition to producing the quarterly magazine, the Association maintains the database, provides job listings online, publishes an annual directory, organizes reunions, sponsors networking section events worldwide, helps in recruiting new students, maintains a student financial assistance fund for loans and grants, and more.

Our big challenge is finding sufficient resources to adequately support the Alumni Association. Increased alumni involvement and support is vital to sustaining that tradition. To encourage more alumni involvement, the School and the Alumni Association have launched a new era of cooperation by entering into a joint operating agreement.

With best regards,

Art Biddle, Met E ’61, CSMAA President

A Special Challenge to Alumni

A Special Challenge to Mines Alumni

As your president and on behalf of the Alumni Association’s board of directors, I challenge Mines alumni worldwide to increase active membership in your Alumni Association by at least 2,000 members. The next membership drive begins in early October, but I encourage you to go online now and renew your membership or fill out the form on page 30 and send it in today.

Let us know if you are up to meeting this challenge. I am confident that you are.

With best regards,

Art Biddle, Met E ’61, CSMAA President

Increased Alumni Support is Vital
About Our Cover:
This is a computer-rendered model of a partially telescoped nanotube with a Leonardo DaVinci manuscript as the background. In the manuscript, DaVinci considers the construction of bearings and also the frictional forces that might be encountered in bearings and sliding surfaces. He also has a drawing of a constant force spring (a mass hanging from a cord over a pulley). A nanotube bearing may be the ultimate realization of some of DaVinci’s dreams. Photo courtesy of Zettl Group at Physics Department, University of California at Berkeley and Materials Sciences Division, Lawrence Berkeley National Laboratory.
The start of fall semester 1935 at Mines was a little different from previous ones. Typical of other colleges during the depression years of the 1930s, Mines had seen an increase in each year’s freshman enrollment. However, in 1935 only 160 men registered as freshmen. For the first time in years, the sophomore class outnumbered the freshmen. Total enrollment for the school year 1935-36 was 547 students, all men. Among the freshmen entering Mines that year was Vesper “Bud” Vaseen Met E ’39. Vaseen was born and raised in the Denver area. He grew up with an innate curiosity that he satisfied by reading every book he found interesting at his local public library. He continued his intellectual curiosity at Mines, graduating as a metallurgical engineer. By the time Vaseen graduated in 1939, his class had become the largest graduating class in history: 132 men received degrees that year.

The Oredigger remarked that the graduating class was facing a rosier job market and that 35 percent of the class had jobs at graduation time, with 90 percent of the class to be employed by September.

Vaseen’s first job after graduation was assistant sanitary engineer for the State of Colorado. Although he earlier lost an eye in a work accident, he joined the U.S. Army in World War II and served until 1946 as a sanitary engineer at two Army bases. He left the Army with a rank of major. After the war, Vaseen worked for a private engineering firm in Denver and was responsible for drawing up the original plat for what would become the city of Thornton. He also developed water and sanitation districts in the Denver area as it experienced population growth after the war. In 1966, Vaseen began to work for the engineering and construction company Stearns-Roger. As a project engineer, he was able to work on and develop a number of ideas, translating them into inventions. While at Stearns-Roger, he filed a voluminous number of patent disclosures on a wide variety of subjects including patents on lasers, solar power, odor scrubbers and auto emissions control. There were a few of a non-technical nature. One of the most intriguing was a flat hot dog that would not slip out of the bun as easily as the traditional shaped one.

Vaseen retired from Stearns-Roger in 1980 to devote himself full-time to his inventions and to start his own company, AVASCO Consulting Engineers. He developed ideas and concepts that were eventually patented including ways to minimize subsidence in coal mines, generating methane from underground coal seams, a new kind of wind-powered generator, a portable lung apparatus, and a rotating drum fermentor that he sold to Coors. Vaseen also was interested in developing games, especially ones that would teach science concepts. One of these patented games, Polytopia, was sold to Kadon Enterprises, a game company that markets the game under the name Combinatorix. This game is for sale and available at www.gamepuzzles.com. Vaseen developed a number of other games as well. All of them are aimed at engaging the mind to creatively reason and solve scientific challenges.

During Vaseen’s career, he developed more than 400 concepts that were transformed into inventions, and he holds 33 patents on those inventions. He is also the author of more than 70 articles and technical papers. In 1996, he gave Mines his files and records on the inventions and patents he has done and assigned a number of his patents to the School. His collection of material is now housed in the library and documents the creative process he undertook to develop his ideas and inventions. He hopes that students will be able to use his ideas and inventions in the course of their work at Mines.

Vaseen lives in Wheat Ridge, Colo., with his wife, June, whom he married 63 years ago. They have a daughter in the Denver area and a son in Pennsylvania. He recently observed the anniversary of his graduation from Mines 65 years ago. On an information sheet Vaseen filled out for his 50th class reunion in 1989, he credited Mines with providing him “a background for earning a good living, a satisfying career and an enhanced curiosity which will never be satisfied.” That curiosity can be explored in the collection of materials he has made available to the Mines community at the library.

1939 Graduate Passes on Legacy of Rewarding Career

By Robert Sorgenfrei
Black Belt Karate Expert Wins Caldwell Scholarship

Emily Milian is this year’s recipient of the four-year Florence Caldwell Scholarship. She is a graduate of Cherry Creek High School in Denver and will study chemical engineering when she enrolls at Mines this fall. In addition to being in the top 3 percent of her class, Emily has a black belt in Shaolin Kenpo (karate), lettered in cross country in high school, and is an active volunteer. She has been a mentor for underprivileged children, took part in a Mexico City student exchange program, volunteers at a local library assisting with children’s reading and crafts programs, served as president of “Hope for All,” a charity that provides toys and dresses to the underprivileged and organized Women’s Rights Day activities.

Energy, Bones and Teeth

The 2004-2005 recipients of the Undergraduate Research Scholarship Awards set as follows: Senior Jeremy Breln will study small-scale (less than 10 kW), distributed generation, renewable energy, and its application in electric power systems. Senior Timothy Causas will research emululating bone properties using calcium phosphate and hydroxyapatite. Senior Jason Higbee will pursue advancement in the design and energy efficient applications of small motors in residential electric power systems. Junior Jessica Ramery will determine microstructure, porosity and composition of human tooth sockets and study the development of materials for tooth implants.

Environmental Symposium Features Cement Industry

John Lehn, plant manager for CEMEX’s Lyons, Colo., cement plant, discussed the challenges combining sound financial performance with a commitment to social responsibility and environmental stewardship at the Young Environmental Symposium in April. The event is made possible by a gift from Dode and Herb Young EM ’39 and was co-sponsored by the Audubon Society.

Best and Brightest Honored

Michelle Moreman and Andrew Patrick, pictured with McKnight Honors Program Director Van Laer, were named recipients of this year’s Boren Award for outstanding juniors. Students were judged on their personal and intellectual growth, leadership and commitment to academic excellence and achievement. Michelle was vice president of Associated Students of CSM last semester and is a charismatic, visible campus leader. Andrew has a great analytical mind, outstanding research skills and is interested in both domestic and international politics.

Middleton Visits Yucca Mountain

Nigel Middleton, vice-president for Academic Affairs, visited the Yucca Mountain Waste Repository project site in Nevada. He met with Department of Energy executive management to present an overview of Mines education, research activities and capabilities. During his stay, he and Tibor Bogenyi, Mining Engineering Department head, and Levent Ozdemir BSc Min ’73, MSc Min ’75, PhD Min ’78, professor and director of CSM’s Earth Mechanics Institute, hosted a reception for CSM alumni working with the project: Bruce T. Stanley EM ’63, Robert Boutilin EM ’72, John W. Peters EM ’63, Brian T. Harrington BSc Chem Eng ’02, Mark R. Reineck BSc Eng ’86.

E-days Ore Cart Pull

In celebration of the annual E-Days activities, students walked seven miles to the Colorado State Capitol. On the Capitol steps Gov. Bill Owens read an official proclamation declaring the 70th Annual Engineer’s Day for the state of Colorado.

New Book by Professor

Marcelo Godoy Simoes, CSM associate professor of engineering, and co-author Felix Farret, have published Renewable Energy Systems: Design and Analysis with Induction Generators. The book presents the first comprehensive exposition of induction machines used for power generation. It provides the background and tools a person needs to begin developing power plants and become an expert in the applications and deployment of induction generator systems.

Mines Checks Out Petroleum Industry Collection

The Independent Petroleum Association of Mountain States (IPAMS) formally presented the Arthur Lakes Library with the Gas Technology Institute Library collection. The collection includes vintage periodicals, research, reports, conference proceedings and other resources spanning nearly 60 years.
The Charles Boettcher Foundation awarded a $1.5 million grant to innovative programs in research and education at the Colorado School of Mines. The grant, awarded by the Commission of Higher Education, funded research projects that focused on technology and education. Two of the projects were led by faculty members: one focused on innovative teaching methods in chemical engineering, and the other on sustainable energy solutions.

New Board Members Named

DeAnn Craig BSc Chem ’73, BSc CPR ’80, MSc Min Ec ’92 and L. Roger Hutson BSc Geol ’82 were appointed by Gov. Bill Owens to the CSM Board of Trustees. They replace outgoing members F. Steven Mooney Geol E ’76 and Karen Ostrander-Krug BSc Pet ’84.

Craig is a retired oil and gas industry executive who had an extensive career with Phillips Petroleum. Craig was awarded a Distinguished Achievement Medal by CSM in 1999. She is also a past president of the CSM Alumni Association.

Hutson owns Paladin Energy Partners, LLC, a private firm specializing in the acquisition, operation, and development of producing oil and gas assets. Hutson has served on the boards of the CSM Alumni Association and the Independent Petroleum Association of Mountain States.

True Takes

Students Win Poster Contest

Stephen Liu PhD Met ’84 led the CSM Center for Welding, Joining and Coatings Research delegation to Chicago for the 2004 American Welding Society Convention. The nine students in attendance received compliments on their quality presentations and their excellent technical and professional mannerism. At the convention, Craig Clasper BSc Met & Mat Eng ’91, Fernando Martinez and Justin Chandler BSc Met & Mat Eng ’02 entered three posters in the graduate students’ poster contest and won first, second and third, respectively. A clean sweep!

Hurler Named AAPG Head

Neil F. Hurley, who holds the Charles Boettcher Distinguished Chair in Petroleum Geology, has been elected vice president by the 31,000-member American Association of Petroleum Geologists. His term began July 1.

Hurley holds a bachelor’s in geology and a bachelor’s in petroleum engineering from the University of Southern California, a master’s in geology from the University of Wisconsin–Madison and a doctorate in geology from the University of Michigan.

Three Win Teaching Awards

Honored this year by the Faculty Forum were: Barbara Moskal, associate professor of mathematical and computer sciences, who received the Alfred E. Jenni Faculty Fellowship Award; Ugar Orbeli, professor of mining engineering, who received the Alumni Teaching Award; and Robert Ker, George R. Brown Distinguished Professor of Engineering, who won the Dean’s Excellence Award.

Talent and Commitment Rewarded with Scholarship

This year’s Sister-to-Sister Scholarship winner is Marie Nguyen, who will be a senior this fall. She is a chemical engineering major from Littleton, Colo. Last year she was vice president of the Asian Student Association. This coming year she will be conference chairperson for AIChE and vice president of Tau Beta Pi, the engineering honor society. Marie also is a McKee Honors Program representative. Last summer she worked for Eastman Kodak as a chemical engineering intern and this summer she works for Shell Oil in Louisiana. She isn’t sure what she will do after graduation. “There are so many choices,” she says. “Everyone tells me it’s invaluable to have a couple years of experience before going to graduate school.” Marie is interested in product development in industry, or becoming involved in intellectual property law and also medicine.

Gentlemen, Start Your Engines…

The state of Colorado has proposed establishment of a fuel-cell research center to be housed on the Mines campus. It is presently envisaged as a collaboration that will develop affordable hydrogen fuel-cells for use in vehicles and distributed energy supplies.

May 7, 2004

Mines 130th Annual Commencement ceremonies couldn’t have taken place on a more beautiful spring day. The keynote speaker was Andrew Gould, chairman and chief executive officer of Schlumberger Limited. Of the 531 students that received degrees, 423 were undergraduates and 108 were graduate students.
No textbook had the answer. When this year’s Senior Design students ran into a problem, they had to react as the contestants on popular television reality shows do: Figure it out now.

The 2004 Spring Senior Design Trade Fair gave students the opportunity to present their final project — developed for real clients and customers — to the School and industry representatives. At the annual trade fair, students also discussed the challenges of problem solving, adapting to real life situations.

Exhibits showcased the students’ creativity and hard work. They included projects designed to benefit technology, communities and industries. One project was a removable engine, released with a simple twist of the hand, and then used to operate numerous different machines. Another was the plan and installation of permanent posts, a security system and temporary light strand wiring for the “M” on Mt. Zion. Still another group designed and installed a pump system to provide running water for the people of San Pablo, Belize.

Students discovered that the easy part was selecting a project and developing a written plan. Reality hit when the design was rolled into action and client expectations had to be met. Written plans couldn’t foresee obstacles such as weather changes, equipment malfunctions, cultural differences, miscalculations and budget increases. Just as excited travelers never plan for problems with customs, baggage or transportation, the Senior Design students couldn’t always stick to their plans. Most had to make last minute changes and had to use unconventional methods to get the job done.

At the trade fair it was evident the students’ flexibility and ingenuity had prevailed. Their successful-financed and implemented projects, and the satisfaction of their clients, said it all. Mines students are winners in reality engineering.
Install Your Own

By Elizabeth Hall BSc Eng ’02

During August 2000, I installed a used Grumman Sunstream hot water solar system in my home, complete with a DD-100 active solar control module, an 80-gallon storage tank, and four 3-by-7-foot flat-plate collectors that I purchased for $250. When my home was built during the early 1980 energy crisis, copper pipes were extended from the basement to the roof to accommodate a hot water solar system in order to minimize space and heat loss, the control module was mounted on the south basement wall next to the storage tank and hot water heater.

A contractor vertically mounted the solar collector plates at a 30-degree angle on the south side of the roof facing directly into the sun.

The DD-100 Module system is designed to preheat water entering a domestic water heater with solar energy, thus reducing conventional energy requirements. An antifreeze solution is pumped through the closed module loop at 15 psig where it is heated in flat-plate collectors by absorbing diffused sunlight. Domestic water is pumped from the bottom of the storage tank and through the heat exchanger where it is heated by the circulating antifreeze system and then returned to the top of the storage tank, thus completing the loop. The heat exchanger is activated by a temperature differential control within the module that is connected to temperature sensors in the collector array manifold and the solar storage tank. The system is automatically activated when the differential temperature between the collector array and the storage tank is 10 degrees or greater. Two separate 0.5-horsepower pumps circulate the antifreeze solution and domestic hot water at a rate of two gallons per minute when the system is in operation.

When the differential temperature is less than 10 degrees, the system automatically turns off. The system heats water up to 190 degrees during the summer. Therefore, during the summer months, the hot water heater is turned off and the domestic hot water is generated totally by the hot water solar system.

Since the energy of my flat plate collector depends on the quantity of diffused light absorbed, it is difficult to determine the exact efficiency of the system on a monthly or daily basis. Available solar energy depends on the season, latitude and other factors such as overcast, tilt of the collector plates and the angle between incoming rays. Engineering data for solar collectors located at various latitudes is available and indicates the approximate number of collectors required per household member. I calculated that my summer collector requirement is 28.8 ft² or 1.36 collectors for two people; solar collector requirement is 25.6 ft² or 1.59 collectors. I used latitude of 40 degrees for the Denver metro area and 76 percent mean average sunshine. The total system plus installation cost $1,352.1 estimated that the solar hot water system paid for itself within three years.

When Delmar and Shirley Beverly designed and built their beautiful 4,400 square-foot home in Denver, they also added a passive hot water solar system. They mounted six 4-by-6-foot solar panels on the south side of the roof at a 45-degree angle and installed a custom built drain-down system. The main components of their hot water solar system are a storage tank, an expansion valve for over pressure, a temperature gauge and regulator, a 0.8 hp circulating pump and a pressure gage. The 250-gallon (2,084 lbs.) storage tank is made from reinforced plywood and the interior is leak proofed with a piece roof flashing. The water level remains below the lid at all times, but the tank is also equipped with an overflow valve as a safety precaution. The storage tank contains two 0.75-inch copper tube heat exchangers: one for year-round household hot water supply and the other for radiant heat during the winter. When the differential temperature between the collector array and the storage tank is 5°F or more, the system is automatically activated. Water is pumped from the storage tank through the collector plates where it is heated by the sun and returned to the storage tank. The drain down system does not require an antifreeze solution because when the differential temperature is less than 5°F, the system shuts down and water from the collector plates drains into the storage tank.

The hot water storage tank is maintained at a maximum temperature of 140 degrees. In winter, additional heat is removed from the storage tank to heat the house. On most winter days the water temperature of the tank reaches 125°F. Since 140°F is a safe temperature, water in the tank is not boiled and the system does not require a drain-down system. The system cost the owners about $1,500 to construct. To pay a contractor to install an identical system would have cost approximately $8,000. The Beverly house is totally electric and installed a custom built drain-down system. The main components of their hot water solar system are a storage tank, a solar collector array and an expansion valve for over pressure, a temperature gauge and regulator, an 80-gallon drain-down system, and a drain-down system is not required. By using a drain-down system, the system cost the owners about $1,500 to construct. To pay a contractor to install an identical system would have cost approximately $8,000.

The Colorado Solar Energy Industries Association publishes a consumer guide that lists solar-related companies in Colorado. Many companies, such as Industrial Solar Technologies (www.industrialsolartech.com), sell used solar equipment at reasonable prices and provide guidance on how to install the system and pay solar installers. Local renewable energy companies and many energy-conscious citizens are members of the Colorado Renewable Energy Society (www.cres-energy.org).

The Beverly house is well-insulated and installed with heat mirror windows. The house is comfortable during winter and does not require much air conditioning during the summer. The Beverly house is well-insulated and installed with heat mirror windows. The house is comfortable during winter and does not require much air conditioning during the summer.
Going to Extremes: Materials Science and Engineering  By Mark Eberhart

Most people call this comparatively new discipline “materials science and engineering.” However, it’s really engineering at the extreme, and those who practice it are actually extreme engineers.

For millennia, things were built from the stuff that was available – wood, stone, animal skins. Occasionally, through happenstance and luck, ancient engineers stumbled upon something new like bronze, steel or concrete and the things built from the new stuff changed the world forever. Rome not only wasn’t built in a day, it could not have been built at all without concrete. And the industrial revolution? It turned on steel.

But always, engineers were limited in what they could build by the materials on hand. Only so much power could be coaxed from a jet turbine because more power would produce operating temperatures sufficient to melt the alloys from which the engine was constructed. The glow of an LED was always green because that was the only color light emitted by the crystal used to make the diode. Some engineers and scientists, frustrated with these limitations, turned their attention away from making things and to the stewardship of the Earth and its resources.

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But always, engineers were limited in what they could build by the materials on hand. Only so much power could be coaxed from a jet turbine because more power would produce operating temperatures sufficient to melt the alloys from which the engine was constructed. The glow of an LED was always green because that was the only color light emitted by the crystal used to make the diode. Some engineers and scientists, frustrated with these limitations, turned their attention away from making things and to the stewardship of the Earth and its resources.

The advancement of every technology is, in part, dependent on the development of new materials. This is particularly true for technologies related to the stewardship of the Earth. Extracting minerals from their subterranean hiding places will require new alloys that are simultaneously strong, hard and corrosion-resistant. Realizing maximum efficiency from our energy resources will, among other things, call for the development of molecular sieves that allow one type of molecule to pass while another, similar-sized, molecule is blocked. These sieves may be made from polymers, ceramics or metals. The promise of solar energy awaits new semiconductors that interact with the full spectrum of solar radiation. And if we are to use our scarce resources in an environmentally benign fashion, new catalysts will be needed. It is no wonder that materials science and engineering has been designated a CSM specialty, along with the technologies related to the Earth, energy and environment.

The development of new materials sits at the hub of development of new materials sits at the hub of the Earth, energy and environment. The advancement of every technology is, in part, dependent on the development of new materials. This is particularly true for technologies related to the stewardship of the Earth. Extracting minerals from their subterranean hiding places will require new alloys that are simultaneously strong, hard and corrosion-resistant. Realizing maximum efficiency from our energy resources will, among other things, call for the development of molecular sieves that allow one type of molecule to pass while another, similar-sized, molecule is blocked. These sieves may be made from polymers, ceramics or metals. The promise of solar energy awaits new semiconductors that interact with the full spectrum of solar radiation. And if we are to use our scarce resources in an environmentally benign fashion, new catalysts will be needed. It is no wonder that materials science and engineering has been designated a CSM specialty, along with the technologies related to the Earth, energy and environment. The development of new materials sits at the hub of development of new materials sits at the hub of the Earth, energy and environment.

The materials in film make possible the fuel cell in the Ford Focus, which makes possible the technology in the Jeep Concept. Fully one-third of CSM’s research budget is devoted to materials. Concentrated in five departments/divisions, this research spans the classes of materials from polymers to ceramics, semiconductors to metals, and a broad range of applications from high temperature structural materials to materials for solar cells.

Among the many exciting technologies that CSM researchers are working to stimulate through the development of new materials are those involved in the conversion to a “hydrogen economy,” wherein hydrogen replaces fossil fuels as our primary energy resource. There are advantages associated with such a conversion, but there are also serious materials-related problems that must first be surmounted. These include the development of new materials for the generation, storage and utilization of hydrogen.

Reuben Collins, in the Department of Physics, is working to develop materials that will allow for the transformation of solar energy into chemical energy through the production of hydrogen from water. Such renewable generation of hydrogen represents one of the most versatile ways to store and distribute the energy collected from solar cells. Unfortunately, with current technologies – photovoltaic systems coupled to electrolyzers – only a small fraction of available solar energy can be harnessed, making the hydrogen produced in this process expensive. Materials that would directly convert water to hydrogen (photoelectrolysis) may significantly reduce the cost of solar-produced hydrogen. Working with John A. Turner’s research group at the National Renewable Energy Laboratory, Professor Collins’ study has focused on determining whether semiconductors, such as gallium-nitride, can be developed with sufficient stability and the right combination of electrochemical and optical properties to act as electrodes that, using sunlight, can directly break water into hydrogen and oxygen.

Once hydrogen is generated, it then must be stored and the usual method of storing gases in tanks is just not practical for safety reasons. Who wants to ride in a car powered by a tank of highly compressed and explosive gas? The alternative is to develop materials that take up hydrogen, much as a sponge soaks up water. Then, with a small squeeze, out comes the hydrogen, ready for use. David Olson, in the Department of Metallurgical and Materials Engineering, is working to develop such materials. His research group has been confronted with a significant problem, for while there are many metals and alloys known to soak up large quantities of hydrogen gas, they do not release it easily. Through careful experimentation and modeling, Professor Olson’s research group has created alloys of two types of metals. One soaks up and holds on to hydrogen while the other interacts only weakly, if at all, with the gas. Combined, the alloy made from these metals has just the right combination of properties for hydrogen storage.
Materials Science and Engineering

From a materials perspective, the most complex part of the problem in the development of a hydrogen economy revolves around utilization. The preferred method to capture the chemical energy released when hydrogen reacts with oxygen to produce water is in a fuel cell. Unlike internal combustion engines where significant energy is lost to heat, fuel cells can potentially convert all available energy into useful work. But to realize this potential, the chemical reaction between hydrogen and oxygen must be controlled at the atomic level. Such control places tremendous constraints on the materials used to construct the fuel cells. Catalysts that facilitate the reaction between hydrogen and oxygen must be found. Membranes through which either hydrogen or oxygen can move easily while being impervious to the other species will also be required. Doug Way (Chemical Engineering), Scott Cowley (Chemistry and Geochemistry), Robert Kee (Chemical Engineering), and Dennis Readey (Metallurgical and Materials Engineering) are working with their research groups on various aspects of these materials-design problems. Even when these catalysts and membranes are designed, tested and optimized, we will be far from having the ideal fuel cell, because then we will be confronted with the problem of integrating these materials into the final product. Such integration is often confronted with “incompatibilities,” where materials in contact cease to function as they did in isolation. Research to circumvent such incompatibilities will be required before optimized hydrogen fuel cells are technologically feasible.

Given the complexity and diversity of materials and their properties, it may appear a Herculean task to embark on a course of study that will equip one to engineer materials in general. Fortunately, over the last 50 years or so, we have come to understand that there are commonalities uniting all materials regardless of class, i.e., metals, ceramics, semiconductors, polymers. Understanding the basic chemistry and physics giving rise to these commonalities, combined with a systematic approach to design allows the materials scientist to engineer at the extreme – manipulating atomic scale structure to produce the stuff of 21st century technologies.

August

17 Denver Young Alumni Pub Tour: My Brother’s Bar, 2376 15th St., Denver.
28 Tampa, Fla., soccer event. Call Bob Pearson for information, 800-446-9488, ext. 3959.

September

02 Westside mixer in Golden, Colo. 5:30-8 p.m., Woody’s, 1305 Washington. Get together first Thursday of every month. Look for the CSMAA banner. Pay own way.
04 CSM: Tailgate party before Hall of Fame game. Brooks Field, 11 a.m.-12:30 p.m. Price TBA.
15 Denver Young Alumni Pub Tour: Dark Horse, 2912 Baseline Rd., Boulder.

October

02 CSM: Tailgate party before Ft. Hays State game. Brooks Field, 11 a.m.-12:30 p.m. Bring your own food.
03 Houston: Astros vs. Rockies game, 1:05 p.m. Bring your family! RSVP to Kathy Roldan or Laura Westler.
07 Westside mixer in Golden, Colo. (see Sept. 2 for details)
14 Golden, Colo, Lunch Bunch (see Sept. 9 for details)
16 Durango, Colo., football event at Ft. Lewis College. Call Bob Pearson for information, 800-446-9488, ext. 3959.

The materials in nanotubes make possible hydrogen storage and the hydrogen filling station.
Duane Maue (top) earned All-American honors in 1987, 1988 and 1989 in the nation as a senior with 39 points (16 goals, 7 assists). He was a two-time RMAC Player of the Year, two-time RMAC First Team honoree and a two-time All-Region and All-American selection.

The 1987-88 men’s basketball team compiled one of the best seasons in school history under Head Coach Jim Tomlinson. The Orediggers compiled a 23-11 mark, including 10-2 in conference play, which earned Coach G. W. (Tony) Thomas the program’s first trip to the NCAA tournament. The team finished in second place in the RMAC."}

Two years at Mines, Huber led the Orediggers to a pair of wins, 1985 and 1986. He was named to the RMAC Eastern Division All-Star team. "I am extremely honored and excited to be joining the Colorado School of Mines family and I know that CSM Athletics,” said Huber. “I am attracted to the academic integrity of the institution and am looking forward to further developing the outstanding success of Colorado School of Mines athletics.”

“"I would like to express my appreciation to Mike Ray and his 38 years of service to the Colorado School of Mines as a coach and an administrator,” Cheuvront said. “I am extremely excited about the new leadership Tom will bring to Mines. He is committed to academic excellence, has a very clear understanding of the role of intercollegiate athletics and recreational programs in demanding academic environment and possess the fund- raising skills that I feel can help with the advancements of Mines athletics in the coming years.”

With more than 30 years of experience as an administrator and coach, Spicer will bring with him a wealth of knowledge and experience. A native of Beaver, Okla., he earned bachelor’s degrees from Fort Hays State in 1972 and Northwest Missouri State University in 1973 and master’s degrees from Fort Hays State in 1977 and Fort Hays State in 1989. He also received his master’s degree from FSU in 1977. Spicer was the director of athletics and director of student services at the Butler County Community College and has experience was the director of athletics, physical education instructor, head football coach and track coach for the Durant, Okla., school district. He also coached women’s soccer and baseball at Bishop Miege and Fort Lewis Schlagle high schools.

Spicer is married to the former Kathy McGovern of Denver and they have four children: Matt, Amber, Kristen and Allison.
Colorado School of Mines received gifts of $25,000 or more from the following individuals between February 29, 2004 and June 30, 2004.

Jerome ‘64 and Becky Broussard continued their support of the Broussaud Family Fellowship in Engineering and Technology Management. Their $30,000 gift was in addition to a $50,000 contribution made earlier in the fiscal year. During the Transforming Resources campaign, the Broussauds have made gifts of over $1 million to help establish the master’s degree program in Engineering and Technology Management.

Harry O. Campbell ‘42 donated $35,000 in support of the Campbell Endowment for Excellence in Football and the Undergraduate Championship Football Team of 1939 Scholarship.

Don McWilson ’56 became a new member of the Guggenheim Society with a pledge of $25,000 toward his Transforming Resources campaign commitment of $100,000. The contribution supports both the Dickson Endowed Scholarship and the Mines Annual Fund.

A bequest of $240,663 was received from the estate of Ethel Edye, widow of Alfred Edye ’33. The gift will establish an endowed scholarship fund.

The Dean Burger Memorial Award Fund received an $85,300 gift from Ben Fryrear ’62. The fund is designed to help students who are at risk of leaving school because of immediate financial need—a fitting memorial for Dean Burger, who helped many such students.

Bruce Greweck ’76 established the Underground Construction Professorship in the Mining Engineering Department with a gift of $237,000. This gift was added to his previous $250,000 gift and serves as a challenge to the underground construction industry. The goal is to raise $2.5 million for an endowed chair in underground construction.

Hilja Herfurth generously donated gem and minerals specimens valued at nearly $350,000 to the CSGM Geology Museum. This donated collection will help the museum maintain its status as the premiere showcase for Colorado minerals and mining history.

Robert Martray ’48 made a gift of $97,291 to support the Andes Scholarship program, which provides full tuition to Mines for four students from Bolivia and Peru. This contribution is in addition to the $175,000 donation Martray made in support of the Max W. Bowen Mineral Processing Laboratory profiled in this issue of Mines magazine.

Robert E. V. ’48 and Ann McKee made a gift of $35,556 to the Robert E. and Margaret A. McKee Family Endowed Scholarship Fund. Members of the Mines Century Society at the Copper level, the McKees first established this fund in 1994.

EHL “Mick” Merril ’39 made a $25,000 contribution to support a variety of needs in the Petroleum Engineering Department. Mr. Merril gave an additional $5,000 to the Mines Annual Fund.

Charles L. Pillar ’55 left a bequest of $75,000 for the Pillar Endowed Scholarship Fund. Mines received a partial distribution of $50,000 in unrestricted funds from the estate of Mildred Bold.

The Wyoming Scholarship Fund received an additional $100,000 from J. Don Thorson ’55. The Fund was originally established in 2001 by Joe Dunbar ’55 with a gift of $100,000. Thorson and Dunbar intend to challenge their fellow alumni in Wyoming, with the goal of raising enough to support one new student from Wyoming to attend Mines each year.

CISM received gifts of $25,000 or more from the following corporations and foundations between February 29, 2004 and June 30, 2004.

Baker Hughes contributed $50,000 to support research conducted by Max Porters, the Baker Hughes Distinguished Chair in borehole Geophysics and Petrophysics.

BP contributed $35,000 to support the departments of Chemical Engineering, Engineering (Mechanical Specialty), and Petroleum Engineering; the Minority Engineering Program, minority scholarships; and the Society of Women Engineers.

The Edna Bailey Sussman Fund contributed $45,040 to support its Environmental Internship Program at the School.

In honor of Max W. Bowen EM ’24, J. Robert Maytag has generously donated $175,000 to fund The Max W. Bowen Mineral Processing Laboratory. This new state-of-the-art facility will keep Mines and its students in the forefront of mining education and research.

The Maytag gift is a fitting tribute to Bowen’s professional accomplishments and dedication to the School. Bowen devoted his life to mining operations and general manager. For 12 years, Bowen served on the Mines Board of Trustees and in 1960 he was the recipient of the School’s Distinguished Achievement Award, the highest honor bestowed on an alumnus. Bowen also was president of the Colorado Mining Association in 1959 and authored numerous articles for technical publications.

The Max W. Bowen Laboratory, to be located in Brown Hall, will enhance Mines’ standing as the leading university in the training of engineers for the mineral resource industries. The mineral processing laboratory will be used to train undergraduate students in metallic minerals, energy minerals and industrial minerals processing. The laboratory will also accommodate graduate level research, as well as function as a testing facility for company-sponsored research projects.
Software Bisque Brings Astronomy to the Internet

By Maureen Keller

The problem-solving abilities taught at Mines can be applied in a million different ways. The Bisque brothers—Stephen BSc Geop ’83, Daniel BSc Geop ’89 and Matthew BSc Eng ’90—have used their engineering background to conquer the sky. The three Mines graduates, along with a fourth brother, Thomas, have developed astronomy software, designed a robotic telescope mount and have made it possible for astronomers around the world to access the skies via the Internet. “Astronomy and computers are a perfect match because there are so many problems to be solved,” says Steve. “And many of the problems are solvable by computers.”

Their business, Software Bisque, is housed in the historic district of Golden, Colo. Across Clear Creek, they’ve set up a manufacturing plant that produces the precision robotic telescope mounts. It’s a small operation, but the mount is so sought after, there’s a waiting list of over a year for the finished product.

While still attending Mines, Steve, who has an interest in astronomy, began developing TheSky, which today is the number one software in use by amateur astronomers. It shows the position of the planets, the Moon, comets, asteroids, satellites, up to one billion stars and over one million deep-space objects. It is so sophisticated it is considered research grade. Having developed the software, the brothers realized they needed accompanying hardware to be able to use their software to its maximum potential. Because they couldn’t find what they wanted already in existence, they designed their own. The Paramount ME, which they manufacture in Golden, is a robotic telescope mount that, when used in conjunction with TheSky, creates an interactive, fully-automated pointing, tracking and data acquisition system.

According to Sky & Telescope, “There is no other product like Software Bisque’s Paramount ME, nor has there ever been anything like it before,” writes Dennis di Cicco in the May 2003 issue. He continues his praise describing the product as “a tour de force involving mechanical design, precision machining and software development.” As the Bisques put it, their telescope mount is the integration of electronics, mechanics and software. It is lightweight (65 pounds), portable and programmable, even from a hand-held computer.

The robotic mount costs $12,500, the most reasonably priced high-tech astronomy accessory of its kind. With a telescope, the robotic mount and TheSky, a person can locate and track any one of billions of objects in the sky. Once the mount is programmed, the astronomer can leave for the night and check in the morning to see the images that have been captured. The Bisques have cataloged discoveries made by their customers, which so far total more than 500, including supernovas, variable stars, cataclysmic variable stars, asteroids and comets.

Paramount ME units are being used to drive telescopes in 28 states and 17 foreign countries. In addition, approximately 30,000 amateur and professional astronomers are using their software, which is updated annually. A satisfied customer recently named an asteroid he discovered after the brothers (MPL 12934 Bisque). “It tumbles around in the asteroid belt between Mars and Jupiter. There is nothing special about it other than its name,” says Steve, “but that was a nice gesture.”

In addition to astronomer hobbyists, schools are using Bisque products. Cal Tech remotely uses the telescope system to monitor the atmosphere of Titan, one of Saturn’s moons. The U.S. Air Force uses the system to track satellites every night from the Space Surveillance Center on Maui, sending data directly to Space Command (NORAD) in Colorado Springs. Even secondary schools can participate. Sites at Mt. Wilson Observatory, Calif., Las Companas Observatory, Chile, and Cloudcroft, N.M., have telescopes on Bisque mounts with Internet access. NASA currently funds students’ use, and astronomers can purchase telescope time to control the observatory from any location.

The brothers’ future plans include expanding the capabilities of their hardware-software solutions and making astronomy even more accessible to the general public. “We’re really excited about the new software products we’ll be releasing later this year, and others that are still in the works.”

In 2002, the brothers received the Clyde W. Tombaugh Award for “Technical Innovation in Astronomy” from the Riverside Telescope Makers Conference.
ROCKY MOUNTAINS TO THE WORLD: A HISTORY OF THE COLORADO SCHOOL OF MINES

Rocky Mountains to the World: A History of the Colorado School of Mines

begins at the founding of Jarvis Hall in 1872 through the years as a territorial school to the present. The 225-page, 8½” x 11” book relives CSM’s most historical and important events and includes hundreds of photographs.

Written by Wilton Eckley, CSM professor emeritus.

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80 Years and 4 Generations of Mines Graduates

John B. Cooke IV
BSc Pet ’03, who graduated in December, became the fourth generation of Mines graduates within the Wideman family.

The Mines tradition began 80 years ago with Frank L. Wideman EM ’23 followed 35 years later by his son, Charles Wideman Geop E ’63, PhD Geop ’75. Frank Wideman retired from the U.S. Bureau of Mines in 1969, while son Charles recently retired from his professorship at Montana Tech. Continuing in the engineering. He recently married Elba Schmit Bsc Eng ’04. There may well be a fifth generation Miner sometime in the future.

West

Bakersfield, California
Bakersfield alumni hosted Mines students who were in town for a field session.

West

Gulf Coast

Houston
Houston hosted a reception and annual golf tournament in April. The fourth annual event raised $20,000 for student scholarship. A second reception was held in May.
REUNION 2004
Words of Wisdom from the Class of 1954

Expect surprises!
The Class of 1954 had its 50th reunion in May. The seasoned veterans offered the following advice to those just starting out.

Do well in your selected sector of the business, but pay attention to other disciplines. Be aware of the need also to excel in human relations, business acumen, ecology, communications and ethics, among others. Cause your profession to be a vehicle for a happy life.

Robert Abercrombie PE

Expect to be surprised. Today you can’t imagine what you will be doing 10 or 15 years from now or how you will be doing it. Determine now that you will keep up with new developments as they come. Don’t get too comfortable with your routines.

Harry Aker's PRE

Cherish liberty, freedom and truth.

Arvid Anderson Met E

Observe “Golden” rule #1 – “Do unto others as you would have them do unto you.” Do not observe “Golden” rule #2 – “He who has the gold, makes the rules.”

John M. Anderson Geol E

Be frank, honest, straightforward and accurate. You may not get the immediate recognition you deserve, but character will ultimately pay off. The only certainty is the accelerating rate of change in almost everything. Don’t be afraid to venture forth.

Ted Bergstrom Met E

Work hard, play hard and always keep focused on the good things in your life. Happiness is a state of mind under your control. You’ve had a great education. Use it wisely.

Edward C. Burgan Geol E

Keep the value of the friends you make at Mines.

Bernard Cady Met E

The quality of the knowledge and skill you have acquired during your undergraduate years at Mines is exceptional. Experience, which comes with time in your profession, is ahead of you. Experience, good and bad, leads to judgment. At the end of the day, the quality of your judgment is what you get paid for.

Carl Cross BSc Met, MSc Met ’76, PhD Met ’86

Work as hard as you were taught to at Mines but diversify your expertise.

Philip H. Halstead Geol E

Don’t neglect the people side of the technical problems you encounter. And don’t neglect the arts as a way of enhancing your own life and those of your loved ones.

Richard F. Hatfield PE

Dean Burger, in his letter to the class of 1954, said it better than I ever could: “May the skills and techniques each of you have acquired from the classroom and laboratory, together with the concepts and philosophies you have gained from your associations with the faculty and your fellow students, be effectively blended to give you the personal qualities and the proper sense of values so essential for making a good life.”

Edward W. Heath Geol E

Cherish the friends you made in the last four years. They’re the best you’ll ever have.

Robert B. Joyce Geol E

When I was still in school, my father-in-law gave me a plaque which stated (in Latin) “Don’t let the Bastards Wear You Down.” Keep that thought in mind as you run into the naysayers and detractors of the world. Remember that you have been trained excellently to do your job. Do it with confidence, honesty and determination.

Andy Jurisin Geol E

Nothing is ever easy!

Robert Kendrick EM

Do not be afraid to accept challenges in areas in which you have not been trained. Life is just one long learning experience that does not end when your academic experiences are completed.

Eugene Koch Met E

Expose yourself to many different interests. You never know where the next job might come from.

Dunn Krahl Geol E

Always remember your educational roots at CSM. Maintain integrity in your personal and professional lives. Work hard and keep abreast of advances in your field. Don’t settle for second, but always do a first-class job.

Carl Cross BSc Met, MSc Met ’76, PhD Met ’86


Class of 1969 Left to right seated: Rob Grigg, Thomas Sylvester, Mary Beth Beach, Rosalyn Temple, Bud Temple, John Wright. Standing: Ron Hibbert, John Chapman, Alan Bell, Wes Lyon, Rick Carlson, Jim Krebs.

Class of 1954 Left to right seated: Eric Hopper, Robert Black, Melbourne Miller, Hugh Evans, Philip Lawrence, Hank van Pooled, Buck Curtis. Standing: Fred Deuel, John Mason, Bob Coleman, Bob Reeder, Robert Olson, Hugh Evans, Philip Lawrence, Hank van Pooled, Buck Curtis.

Class of 1949 Left to right seated: Eric Hopper, Robert Black, Melbourne Miller, Hugh Evans, Philip Lawrence, Hank van Pooled, Buck Curtis. Standing: Fred Deuel, John Mason, Bob Coleman, Bob Reeder, Robert Olson, Hugh Evans, Philip Lawrence, Hank van Pooled, Buck Curtis.

Class of 1944 Left to right seated: Max Mott and Joe Soper. Standing: Don Roe and Frank Adler.

Class of 1939 Left to right, seated: Chuck Blomberg, Fritz Weigand. Standing: Herb Young, Ken Hutchinson, Larry Melzer, Phil Garrison.
job for your employer. Great opportunities might come your way. Be ready to welcome them and make the necessary adjustments to your career. Find opportunities to give back to society a portion of that which you have received from it.

Thomas S. Lee Geop E

Your education is just the beginning.

Robert Lofgren Met E

Don’t stay in a job you don’t enjoy. Marry a good woman. Have some kids and spend time with them. Keep a sense of humor!

George Luna Met E

Reach out! Fear not! Mines has given you a great launching so take advantage of this experience. The path ahead is as broad or narrow as you wish to make it. Above all, maintain your integrity.

Donald L. McCull PE

Professor Dr. Carpenter in his address to our graduating class admonished us, “Never confuse effort with success.” My advice is: Give a good day’s work for a good day’s pay. If things don’t work out, take your lunch pail and go somewhere else. Don’t bitch about it!

Allen McGlone Geol E

The “Hard Rock Harmonizers” reunited for a performance at the All-Alumni Banquet. They are a barbershop quartet that performed at CSM while they were students. Members are, from left: Linda McCull (taking the place of Jim Russell ’54 who passed away in March), Pat McCull ’52, Andy Anderson ’54 and Stan Wimerley ’53.

M. Ken Miller Geol E, MSc Met ’59

Do not ever forsake your integrity for advancement or financial gain.

Don’t forget where you came from. Don’t give up under adversity.

Eric Newman Geol E

Hang in there!!

Newell Orr Met E

Always tell the truth concerning your activities and knowledge so you will not have to remember your past comments if required.

Louis Phannenstiel PRE

Don’t compromise your principles. You have to live with yourself.

Mark Spaeth Geop E

Do the work you like that has relevance and value to our society. Pursue it with hope, vigor and ethics, but have FUN along the way. Remember that you can make a contribution.

Roger L. Sullivan PRE

Yogi Berra said it first: “When you come to a fork in the road, take it.”

Lawrence Tisdel PRE

Be flexible and accept change.

Stewart W. Towle Met E

Not only learn, but understand, the engineering basics – you will need them.

Richard Veghte PE

Find a good woman and treat her with respect. Remember, you don’t “own” her.

Walter Weid Geol E


Build a bridge, the students were told. Build it fast. Build it light. Build it using as few people as possible. Build it to look appealing. And, oh yes, build it to hold 2,500 pounds.

Mines hosted the 13th Annual National Student Steel Bridge Competition May 28 and 29. Hundreds of civil engineering students gathered on the Mines campus for a time of fun, learning and fierce rivalry. A record 45 teams entered the competition with hopes of becoming national champions. After qualifying at regional competitions, they came from around the country, as well as from Canada and Puerto Rico. The competition was sponsored by the American Society of Civil Engineers and the American Institute of Steel Construction Inc.

Students were challenged to design, fabricate, construct and test the best-performing steel bridges. Teams were made up of six students or less. They constructed the bridge over a blue tarp, representing water. Only one team member, designated as a barge, was allowed in the "water." Construction was timed and then multiplied by team members to get a "person-minutes" time. Penalties, like dropping tools or stepping out of bounds, were added to the total time in the form of "person-minutes." Candy Ammerman BSc BE '81, faculty adviser to the CSM chapter of the American Society of Civil Engineers, said, "They make mistakes and learn from these mistakes. They learn how to weld, fabricate steel and machine joints. Once fabrication of the bridge has been completed, the students work as a team to find the fastest method to construct the bridge within the requirements of the rules."

After construction, each bridge was loaded with 2,500 pounds distributed over the bridge's length. If the bridge's deflection exceeded two inches, the bridge was disqualified. Finally, the bridge itself was weighed. The goal was to design the lightest bridge that could be easily and efficiently constructed and support the required load with the least deflection. The teams were judged by 46 professional engineers on speed of construction, lightness, aesthetics, stiffness, construction economy, structural efficiency and overall performance of design. "All aspects of this competition require teamwork and all aspects have engineering components. This is an excellent civil engineering competition," said Ammerman.

After 11 bridges were disqualified, the winners turned out to be North Dakota State University, first place; the University of Michigan, second; and Southern Polytech State University, third. The Mines team placed 30th.
People watch

Pieters ’79 Helps Out in Iraq

Dennis Pieters BSc
Geol ’79, MSc Pet ’92,
PhD Pet E ’93 was
hand-picked to be the
subsurface, subject
matter expert to the
Army Corp of
Engineers for the
rebuiding of oil
infrastructure in Iraq
last year. Stationed in
Kuwait, he worked
out of the Crown
Plaza Hotel and
Camp Doha with
Gen. Robert Crear,
head of the Army
Corps of Engineers on
project Rebuild Iraqi Oil, a joint task force between Halliburton
KBR and the Army. The team, which included a cross-section of
engineering disciplines, was tasked to estimate the cost of
rebuiding the Iraqi oil facilities to pre-war levels and presented a
report to President Bush. The expenditure was subsequently sent
to Congress for appropriation.

Pieters’ days started at 4 a.m. when the engineers and other
technical specialists met 60 miles from the Iraqi border to form a
convoy for the long drive to Basra. They passed through villages
where restless children begged with outstretched hands for water
and food while suspicious older males locked ready to throw
rocks or missiles. The team met with engineers and managers of
the Iraqi South Oil Company to inspect the surface facilities. The
work was dangerous and daily temperatures routinely reached
130° to 140° F.

A developing insurgency hampered the engineers’ task and a
lack of security led to “stove-lost” of all the oil field facilities.
They were stripped bare. The Corps resolved the security issue by
hiring opposing tribes to guard the facilities. Twelve wells were
destroyed, which extends into Kuwait. The terminals in Bakr and Khawr
al-Amaya, south of Basra, were attacked and temporarily had to
be closed. In May, the country was shipping only 1.8 million
barrels a day, in contrast to the 2.5 to 3 million barrels exported
before the war.

The opening of a second offshore oil terminal in the south should
also increase exports by a few hundred thousand barrels a day.

People watch

It is now anticipated that it would take five years at a
minimum for the industry to reach a reasonable level of
efficiency and 10 to 15 years to have a modern industry with
a final cost of $30 billion.

A new engineer is now on the project stationed in
Baghdad on an irregular basis, since traveling in and out of
the country has become extremely dangerous. Work has
delayed considerably and deadlines have been shifted
because all work depends on security of personnel. Right
now security is severely lacking.

Energy is a vastly important commodity and the
equipment and tools and techniques
Pieters learned at Mines
prepared him for the
technical work as well as
the challenge of dealing
with a diverse group of
people who had been
under pressure and
repression for so long. He encourages more students to enter
the field of petroleum engineering as more exciting
opportunities lie in store for world travel and working and
existing with other cultures.

End of an Era for Kay ’63

By Steve Smith

The office of Mark Kay EM ’63 is full of pictures, awards,
plaques, books and other items associated with 47 years of
involvement at CSM. So it’s safe to say it might take a while to
clear out now that Kay has retired as athletic director.

Kay played football and wrestled for Mines in the late
1950s and early 1960s. He was CSM’s football coach for 26
seasons and still holds the School record for most wins with
84. In 1995, he became the School’s athletic director.

“It’s time to transition into the next phase of my life,” Kay
said when announcing his retirement. “I’m enjoying good
health. I enjoy the association with the staff and the students.
You never want to go out too early and you never want to
stay too long. Hopefully, I’m somewhere in between.”

Northern Oil Company in Tikrit. The Rumaliyah field is plagued
by corrosive high salt content in the crude that wrecks havoc with
the wellbores tubulars and needs to be washed before
transportation and refining. Pieters was instrumental in
evaluation of the field performance with its massive water
injection system installed in the late 1970s and brought on line in the
early 1980s to supply energy to the reservoir because of the
armat which restricts aquifer support.

Pieters said it was interesting working with the knowledgeable
Iraqi engineers who have had to work under extremely dangerous
conditions to produce oil without the proper
equipment and with makeshift resources under the
embargo. A field resource this size should have had a simulation model and carefully
recorded information to manage it from the
onset of production. Pieters found the engineers
eager to get their hands on the latest technology
that they had only been reading about during
the long years of the embargo.

While Pieters was in Iraq, he obtained the
first pre-war contract to run seismic data and
prepare detailed simulation models for the
Rumaliyah field. Unfortunately, seismic
information was difficult to obtain because of
land mines and other unexploded ordnance
which needed to be cleared and problems with an
unreliable supply of electricity for the
sophisticated workstations and other
computer equipment to be used for analysis and simulation.

Since Pieters has returned to the United States, the Iraqi
situation has deteriorated. Repairs on pumps for the water
injection system in Rumaliyah field have been delayed because of
security problems reducing the workday and making some days
too dangerous to travel. Another problem was that the necessary
large, high-volume flow equipment could not be found on the
shelf and had to be specially manufactured. In addition, export
production through Turkey from the northern Iraq field of
Kirkuk was delayed by numerous incidences of sabotaged
pipelines. This consequently led to a missed deadline for
achieving pre-war levels of export production by the end of 2003.

In March and April, the security situation worsened still further
in Baghdad and spread to the south, which had been relatively
quiet compared to Baghdad. The terminals in Baku and Khasaw
al-Amaya, south of Basra, were attacked and temporarily had to
be closed. In May, the country was shipping only 1.8 million
barrels a day, in contrast to the 2.5 to 3 million barrels exported
before the war.

To date, $1 billion has been spent rebuilding the oil industry and
another $1 billion on importing benzene (gasoline) and LPG
for cooking and heating this past winter. Expectations are that
another $1 billion will be spent this year on restoration and
upgrading of oil fields and refurbishing of refineries. The
opening of a second offshore oil terminal in the south should
also increase exports by a few hundred thousand barrels a day.

People watch

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another $1 billion will be spent this year on restoration and
upgrading of oil fields and refurbishing of refineries. The
opening of a second offshore oil terminal in the south should
also increase exports by a few hundred thousand barrels a day.
Kay’s father played for Mines in the late 1930s. In fact, Kay was born when his father was a junior at CSM. The younger Kay followed suit by charting the progress of the Orediggers’ athletic teams as a teenager, then by choosing to attend Mines in 1956. Kay planned to become an engineer, but the late Fritz Brennecke, Kay’s football coach at Mines, changed those plans. “I got my degree, but Fritz felt I could be a coach,” Kay says. “He hired me and I found out I enjoyed it and realized it was something I wanted to pursue as a career. Fritz gave me that opportunity. Next to marrying my wife and having my family, it was the best decision I made in my life.”

Collegiate athletics has changed since the 1950s. Coaches no longer coach multiple sports. Early in Kay’s career, some coaches were in charge of as many as three sports at one time. Another area of change is the demands placed on student-athletes at Mines. “We are asking much more in the way of time spent athletically than ever before,” Kay says. A third change is what’s available to students. “The School has made tremendous strides from an administrative standpoint in the opportunities provided for athletics, physical education classes and club/recreational sports. These improvements are important to the overall university experience for students.”

One thing that hasn’t changed is the demands on a coach’s time. “You put in a lot of long hours. You experience the ups and downs that accompany the team triumphs and failures,” Kay says. “But for all the difficult times, there is a positive side—the willingness and the desire of the student-athlete to do the very best they can.” Kay particularly enjoyed the daily interaction with student-athletes and their families. “I couldn’t have had a better opportunity in the world than to work with the young people I’ve had a chance to work with. I had a chance to visit with them in their homes and meet their parents and work with them through a four- or five-year college career. That was a pleasure. Most have gone on to make successful contributions to society as citizens and professionals. I’ve been enriched by that experience. I hope that in some small way I contributed to their success.”

In addition to Brennecke, Kay worked with two other CSM coaches who helped bring him to campus – wrestling coach Jack Botelho and hockey coach Dan Pratley. Botelho was an avid tennis player and played daily until one month before his death. He traveled the world as a mining consultant and spent many years in the Philippines as an exploration geologist. At one point, he and his wife owned and operated a motel in California near Ft. Bragg. Botelho is survived by his widow, Harriett, a daughter, a granddaughter, a sister and many nieces and nephews.

Lio N. Bradley EM ’42

Lio N. Bradley died April 24 in Denver after a short bout with cancer. He was 78. Bradley was an influential lawyer and maverick land broker who helped shape Jefferson County, Colo. He was a force in the county’s politics and major land cases. Bradley married Patricia Quaintance, a descendant of Jesse Quaintance, one of Golden’s first pioneers. The Quaintance family acquired nearly 10,000 acres in Golden’s Creek and Clear Creek canyons and parts of Jefferson County including Red Rocks, Bear Creek and Clear Creek canyons and parts of South Table Mountain. Bradley sold several thousand acres to the county for open-space usage. Over the years, Bradley served as a trustee for the School, a board member for the Colorado National Bank and as general counsel to Coors Brewing Company. He is survived by his widow, a daughter, a son and two grandchildren.

John B. Botelho EM ’42 of Sun City, Ariz., died peacefully in his sleep Nov. 23 after a battle with colon cancer. He was 84. Botelho was an avid tennis player and played daily until one month before his death. He traveled the world as a mining consultant and spent many years in the Philippines as an exploration geologist. At one point, he and his wife owned and operated a motel in California near Ft. Bragg. Botelho is survived by his widow, Harriett, a daughter, a granddaughter, a sister and many nieces and nephews.

John A. Brandon EM ’49 of Campbell River, British Columbia, died Feb. 1 surrounded by his family. He was 79. Brandon was in the mining business for 35 years doing every job from mucking to manager. After graduation, he worked for Asarco in New Mexico as mill metallurgist, miner and shift boss. He then became a jackleg demonstrator for Atlas Copco before returning to Asarco at the Page Mine as shift boss until 1957. Brandon’s next job was with Hecla Mining Company where he developed the industrial engineering department and became chief industrial engineer. He left that position to become mine superintendent at the Sunshine Mine, followed by employment in the uranium industry working for Getty Oil and Western Nuclear. In 1969 he joined Cities Service to develop and expand the Miami, Ariz., copper mine and remained there until his retirement in 1979. After retirement, he had one more assignment, a tunnel project at Revelstoke. In retirement, Brandon fished and started a gun repair and custom gun building business. He later settled into hobbies and bridge playing. Brandon is survived by his wife of 59 years, Virginia, three daughters and six grandchildren.

Courtney E. Cook PE ’94 died Feb. 18. He was 61. As a boy, Cook delivered the Denver Post and attended Englewood, Colo., public school. In 1936, he won the first Denver Soap Box Derby. In 1945, he joined the Field Artillery at Fort Sill, Okla., and transferred to the Air Force in 1944 where, as a second lieutenant, he flew B-25s. In 1946, Cook married Mary Virginia Blesley after having met her in Tulsa during the war where they were both in the service. It was love at first sight. After graduation from Mines, Cook worked in the oil fields of California in 1985. His hobbies included restoring Chevrolets, carving wood and painting gourds. His beloved wife died in 1999. He is survived by three daughters, Carol, Melody and Tracy.

William G. “Bill” Cutler PE ’48 died of a heart attack at his Denver home March 11. He was 81. While at Mines, Cutler was a member of Kappa Sigma fraternity. From 1942-46, he served in the Army Air Corps as a first lieutenant. His career as a manager of drilling and production operations involved several positions of responsibility including employment with Chevron (Rocksies), United Geophysical, J. Ray McDermott (USA), Pacific Northwest, which merged into El Paso (Farrington and Salt Lake), Moran International (London and Bermuda), Pan Ocean (Lagos and Nigeria), Parker Drilling (Pakistan), then back to Denver with Northwest Exploration, Anschutz Corporation and finally as a petroleum consultant. Cutler loved his family. He also loved his sailboat, sail and most of all golf. Classmate Dave Copley PE ’48 remembers, “The best way I can sum up Bill is that he was a real gentleman. He was honest, helpful and kind along with being very intelligent. I cannot recall his doing or saying anything mean to anyone.” Cutler is survived by a son, a daughter and four grandchildren. His wife, Mary Lou, predeceased him.

Henry M. Evers ET ’35 died of pneumonia Oct. 31 at age 93. He was a resident of The Baptist Homes in Pittsburgh. Evers attended CSM on a full four-year scholarship and, according to his daughter, he felt deep appreciation for his education. Among his treasures were his college math books. Evers began his career at U.S. Steel’s Duquesne Works in Pittsburgh in 1935. He excelled as a problem-solver and was sent to New Jersey.
for one year in research as a research scientist. After seven years with U.S. Steel, Evers, then 32, accepted a position with the Specialty Steel Division of Universal-Cyclops Steel Corp. in Bridgeville, Pa., where he worked until his retirement at age 65. At that time, he was assistant general superintendent of the Bridgeville plant. Before his retirement, he designed an entire new plant. The owner of Cyclops once said that Henry Evers knew more about making steel than any other man in Pittsburgh. Evers was preceded by his wife, Edith. He is survived by two daughters, Elizabeth Husted and Sally Birmingham, five grandchildren and two great-grandchildren.

STEPHEN V. Kearney BSc Min ‘82 died April 2 of a stroke in Johannesburg, South Africa, at age 45. After graduation from Mines, Kearney faced a choice of coal mining in the United States or gold mining in South Africa. He chose gold and joined Goncor, where he enjoyed a meteoric rise eventually becoming general manager at two mines. He then took over Impala platinum mine and turned it into one of the world’s most efficient and lowest-cost producers. Before he could be successful at Impala, he had to resolve a long-running dispute with the Bafokeng people, owners of the mineral rights. “He was very personable,” says Peter Joubert, Impala’s current chairman, “easygoing, casual, intensely people-oriented and very emphatic about the importance of team building.” Later, Kearney was recruited by the Bafokeng tribe to head Royal Bafokeng Resources, a company whose purpose is to expand the Bafokeng people’s involvement in mining. Kearney is survived by his former wife Robinn BSc Geop ‘81 and four great-grandchildren and four great-granddaughters.

FREDERICK M. “Fred” MacLean PE ’38 of Corpus Christi, Texas, died March 13. He was 90. MacLean was an Army veteran of World War II, a petroleum marketing engineer with Conoco for more than 30 years, a world traveler and avid raconteur. He is survived by his widow Luella, Yorkshire terrier Pluto, sister Marie and her husband, Robert France PE ’36, two daughters, a son, three stepdaughters, two grandchildren and four great-grandchildren.

THOMAS O. May Geol E ’49 died at home in Federal Way, Wash., Feb. 11 at age 83. During World War II, May enlisted in the Marine Corps and served in the Pacific as a fighter pilot, taking part in the invasion of Okinawa. He also served in Korea and was awarded the Distinguished Flying Cross and several other medals. While at Mines, May was a member of Blue Key, Tau Beta Pi and Sigma Gamma Epsilon and belonged to numerous engineering associations. For 20 years he worked for Chevron Oil in the United States and Canada. In 1962 he was transferred to Chevron Canada as chief geophysicist and successfully directed the company’s Canadian geophysical activities until 1969. He then became chief geophysicist for Hamilton Brothers Oil Company of Denver. May explored for oil and gas worldwide until his retirement in 1982. He loved the outdoors, especially the mountains, and was a dedicated scientist and a wonderful family man. Throughout his life he was known as a jovial person who gave support to others. May is survived by his wife of 47 years, Peggy; three sons, seven grandchildren and a brother and sister.

Murry C. McKinnon PE ’52 died Jan. 24 at age 73 of lung cancer at home in La Jolla, Calif., surrounded by his family. After graduation from Mines, where he was a member of Sigma Alpha Epsilon, McKinnon entered the Naval Graduate School and served as a meteorologist in Hawaii and in the atomic bomb tests in Anuwotok. He then began a long and successful career in oil and gas exploration, first working for Mobil Oil. He then held several executive posts with Central Del Rio Oil, Pan-Canadian Petroleum and other companies in the United States and Canada before forming American Energy Capital Corporation, an independent oil and gas exploration and production company in Houston. McKinnon was a long-time member and past-president of the Petroleum Club of Houston. A native Californian, he had recently retired to La Jolla. He is survived and missed by his widow, Janet, three children, five grandchildren and a brother.

DIANA L. Michaels BSc Eng ’95, MSC Eng ’96 of Edmonton, Alberta, died Jan. 21 at age 40. Michaels was born in Arvada, Colo., and grew up in Colorado, California and Idaho. She returned to Colorado in 1982 and attended Red Rocks Community College before earning degrees from Mines. She was married to Mark Dykes and the couple lived on Lookout Mountain in Golden where she could easily access hobbies she enjoyed including hiking, backpacking and whitewater rafting. Michaels was a rafting guide in 1992 and 1993. She played clarinet, flute and piano. Michaels read widely in biology and history, as well as scientific and technical subjects. She also loved to bake, especially novel dishes. According to her family, Michaels was experiencing severe and painful physical problems before she died from complications related to medication she was taking. She is survived by her husband, two sisters, a brother and her parents.

EDWIN H. “Ed” Montgomery ME ’51 of Walnut Creek, Calif., died July 25, 2003, at age 76. Montgomery was born in San Fernando, Calif. He enlisted in the Navy for two years near the end of World War II. After graduating from Mines, Montgomery started his career as a mining engineer in the small mining towns of Leadville, Colo., and Globe, Ariz. He later worked for the Bureau of Land Management, Department of Interior and worked in the Bureau’s Colorado and Washington, D.C., offices. While employed by the Bureau, Montgomery was responsible for policy development and adoption promoting public ownership, multiple land use by the public, and appropriate public management under the Federal Land Policy Management Act. His duties involved increasing public understanding and support for the proper management of public lands. He retired from federal service in 1980. However, he kept busy with numerous jobs including consulting, being a part-time bookkeeper/accountant, and most recently writing a book about his family’s genealogy. Montgomery is survived by his wife of 53 years, Shirley, a son, two daughters, eight grandchildren and a sister.

CHARLES L. “Chuck” Pillar EM ’35 died Dec. 5 at age 92. He was retired co-founder and principal of Pillar-Lowell & Associates, a consulting firm specializing in the development of underground mining systems for mining projects worldwide. After graduating from Mines, he was a shift boss for Park City Consolidated Mines in Utah. He next joined St. Joseph Minerals Corp. in 1937, where he was promoted from foreman to mine engineer to assistant mine superintendent. In 1942 Pillar joined the U.S. Army Air Corps and served in the Pacific Theater until his honorable discharge as a major in 1945. He then joined Placer Development Ltd. and eventually became vice president of operations until his retirement in 1975. At that time he formed Pillar-Lowell & Associates and spent the next 10 years consulting on a variety of mining projects for more than 25 companies around the world. Pillar is survived by three daughters.

JAMES R. Russell PE ’54 of Spring, Texas, died March 1. He was retired from Amoco Production Company, where he worked for 38 years in Wyoming, Texas, New Mexico and Egypt. Russell is survived by his widow, Lois, sons Bob, Steve, Don and Bill, four grandchildren, cousins and many friends.

NEVIN ZETZ EM ’51 died Jan. 11 at his home in Grand Prairie, Texas. He was 74. Zetz saw service in the Korean War with the U.S. Army in Japan. He was a foreman at Crucible Steel in Midland, Texas, and was a refractory supervisor at Chaparral Steel for 20 years. Zetz was a member of Holy Trinity Serbian Orthodox Cathedral, Whitehall, the Sherlock National Federation, Pittsburgh and Veterans of Foreign Wars, Grand Prairie. His wife of 33 years, Janice, a daughter and a sister survive him.
Acute in San Francisco.

1997
Scott S. Belkin
Belkin CIO is a project manager for the Department of Energy in Denver, Colo.

1998
Wang Qiu
Belkin CIO is a senior environmental engineer for IntegraSoft

2000
Seth S. Belkin
Belkin CPO is a project manager for the Department of Energy in Denver, Colo.

2003
John R. Bird
Belkin CIO is a senior environmental engineer for IntezaSoft

2004
Tom B. Bird
Belkin CIO is a senior environmental engineer for IntezaSoft

Remote Sensing
SANDRA L. PERRY

- Remote Sensing, Analyzing and Visualizing Geospatial Data - University of Wisconsin - Madison, WI
- Imaging Spectroscopy - University of Maryland, College Park, MD

Looking for any other postings at www.alumnifriends.mines.edu

Joels from Advance (Engineering Intern) and "Father/Husband Engineer"
is a technical assistant for Gaffney, Cline & Associates in Houston.
Christopher J. Good BSc Eng, MSc Eng & Tech Mgmt ’03 is a mechanical and radiological engineer for Alpha Group & Associates LLC in Brownsfield, Colo.
Adam D. Goodworth BSc Eng is a graduate student at CSM.
Jeffrey L. Hampton BSc Eng is an assistant field inspector for Wolfe Associates Inc. in Englewood, Colo.
Martin R. Jerton BSc Eng is a test engineer for Ping Inc. in Phoenix.
Sandy J. Lindsell BSc Math & Comp Sci married Donald E. Focke II BSc Math & Comp Sci April 3.

2003

Andy Aakhus-Witt BSc Play is a manufacturing technician for Donald Fruder, Gerald in Lakewood, Colo.
Abigail S. Batin BSc Chem is a graduate student at Stanford University in California.
Justin Carlson BSc Eng is a graduate student at CSM.
Yong Chen MSc Pet. Reservoir Sys is an exploration geologist for Dongfeng Petroleum Company in Shandong Province, China.
Jon M. Collins MSc Math & Comp Sci is a graduate student and teaching assistant at Rensselaer Polytechnic Institute in Troy, N.Y.
James L. Dennis BSc Eng is an electrical engineer for Biley Engineering in Denver.
Daniel Fernandez-Garcia PhD Emer Se is a post-doc at the University of Valencia in Spain.
Sonia A. Heneskie BSc Eng is an associate with Wils, Jancy, Elmer Associates Inc. in Lakewood, Colo.
John L. Hillert BSc Chem Eng is a professor for ESSEC Escola del Informacio in Nanhae, Pa.
Joshua M. K. Holleman BSc Eng is a project engineer for CLC Associates in Greenwood Village, Colo.
Chip D. Kuro BSc Eng is a project engineer Ares Construction in Aurora, Colo.
Saki Krishna Dharmadhikary PhD Met & Mat Eng is a research and materials engineer for Exponent in Philadelphia.
Matthew A. Larson BSc Eng, MSc Eng & Tech Mgmt ’03 is a project engineer for Circle of Light, a non-profit organization working to bring electricity to remote parts of Africa.
David M. Weaver BSc Eng, BSc Eng is a project engineer for Zimmerman Metals Inc. in Denver.
Marina N. Zulall BSc Eng is a water resource engineer for the USBO Corporation in Westminster, Colo.

Joshua S. Rogers BSc Eng is a field engineer for GeoRisk Engineering Consultants Inc. in Commerce City, Colo.
Brittany R. Buehler BSc Eng and Nathan K. Kothle BSc Eng are environmental specialists for the Florida Department of Health in Naples, Fla.
Adam D. Seller BSc Eng is a field engineer for Shenhua in Vilahermosa, Mexico.
Maria T. Santiago MSc Min E is a research analyst for Borecky Technology LLC in Lakewood, Colo.
Kyle A. Sandberg BSc Eng is an accountant for Seale LLP in Seattle.
Cassy A. Spitzer BSc Eng, BSc is a transportation engineer for HDR Engineering Inc. in Denver.
Jamie Swartslander BSc Eng and Andrew Hedley MSc Eng & Tech Mgmt were married March 27 in Los Vegas. Jamie is a civil engineer with PB30 in Chantilly, Va.
Torkay Suphaphathanon M Eng Pet is a petroleum engineer for the Unocal Corporation in Bang Khan, Thailand.
Andrew K. Trigg BSc Min is a mining engineer for Glensa Gold Ltd. in Durango, Colo.
Cassy A. Warren BSc Eng is a second lieutenant in the U.S. Army.
Breit L. Wischnitz BSc Eng is a bridge inspector for HFLM-IDM in Golden, Colo.
Hector A. Williams MSc Pet is an engineer de perforacion for Petroleos de Venezuela PDVSA in Maracaibo, Venezuela.
Elian K. Young BSc Math & Comp Sci is a programmer for QuantumPM in Golden, Colo.
Joseph P. Zugall BSc Eng, BSc is a project engineer for the M.A. Mortenson Company in Westminster, Colo.

Five Pathways to Effective Giving

Making a gift to Mines can do more than support outstanding students, faculty, and programs. Charitable gifts can also benefit your personal financial planning. Whether you seek to limit tax exposure or provide ample financial resources for loved ones, a charitable gift plan exists to meet your needs. The chart below illustrates a variety of planning options that have enabled donors to address their own financial needs, while providing substantial support to the School. For additional information or a confidential consultation, please contact the Office of Institutional Advancement at (303) 273-3275.

<table>
<thead>
<tr>
<th>Type of Gift</th>
<th>Possible Funding Assets</th>
<th>Benefit to Donor</th>
<th>Disposition of Income</th>
<th>Financial Benefit to Mines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appreciated Property</td>
<td>Stocks, bonds, mutual funds, real estate</td>
<td>Charitable deduction for full value of gift</td>
<td>Not applicable</td>
<td>Full value of donated asset</td>
</tr>
<tr>
<td>Bequest</td>
<td>Specific property or amount, retirement funds, percentage of estate</td>
<td>Avoidance of capital gains tax</td>
<td>Not applicable</td>
<td>Full value of donated asset</td>
</tr>
<tr>
<td>Income-Generating Gift Plans</td>
<td>Cash, stocks, bonds, mutual funds, real estate</td>
<td>Avoidance of capital gains tax</td>
<td>Variable or fixed income to donor and/or others for life or a term of years</td>
<td>Value of assets at termination of plan</td>
</tr>
<tr>
<td>Deferred Inheritance Trust</td>
<td>Assets with high potential for appreciation</td>
<td>Avoidance of estate or gift tax</td>
<td>Income to Mines for a specified period with principal returned to heirs</td>
<td>Value of income stream during specified period</td>
</tr>
<tr>
<td>Life Estate Agreement</td>
<td>Residence or farm</td>
<td>Partial income tax deduction</td>
<td>No income; donor retains right to use property for life</td>
<td>Value of property at termination of donor’s interest</td>
</tr>
</tbody>
</table>

“Marilyn and I have taken great satisfaction in establishing a gift that provides benefits to us today and will furnish valuable support to Mines in the future.” — Robert T. Reeder EM ’49
Hanney Davey shakes hands with her coach after winning the 2004 NCAA Division II National Championship in the 3,000-meter steeplechase. Hannah is a sophomore from Evergreen, Colo., and is Mines' first national champion. The 10 points she earned at the meet held at Mount San Antonio College helped the Orediggers place 19th overall.