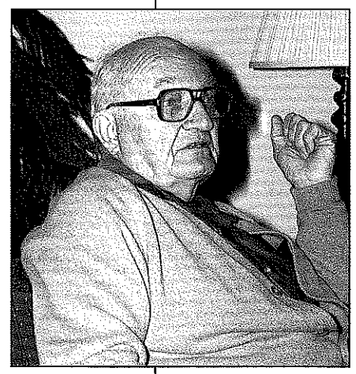
Mines magazine

Colorado School of Mines Alumni Association April, 1990

Mines Magazine

Colorado School of Mines

April, 1990 Volume 80 Number 3



Cover

Come by balloon, arrive on horseback, but come to the Reunion! (photo by John McMillin)

Errata - Due to an error in production *Mines Magazine* inadvertently deleted two names from the list of Board of Trustees. The complete list is: Sally Vance Allen, Donald E. Miller, Anthony L. Joseph, Terence P. McNulty, Monte Pascoe, Charles E. Stott, Jr., Russell L. Wood, and Dave Lawler (student).

Official organ of and copyrighted, 1990, by the Colorado School of Mines Alumni Association. Second Class postage paid at Golden and Boulder. Subscription price: non-alumni subscribers, $30.00 per year United States and Canada; $35.00 foreign surface mail; $75.00 foreign air mail. Single copies $2.00, except special editions. Directory issue $25 for members; $50 non-members. Published 8 times per year. The publisher reserves the right to determine content of advertising carried in the magazine. All correspondence including Postmaster **Form 3579** should be directed to: CSM Alumni Association, Colorado School of Mines, Golden, CO 80402. Publication **#ISSN 0096-4859.**

Closing a Gap

Geology as a science is becoming more closely aligned with computers to deal with massive amounts of data, and to test and explore scientific principals. Professionals still need to know what is on the ground, still need to understand the basics. Yet the School of Mines has been caught in a computing gap in the last few years which has hindered faculty, staff and students from achieving the best results from teaching or research.

Five years ago Mines did not have a computer science program; now it has 70 undergraduates pursuing a program which is not specific to one discipline, a degree which can be applied to a variety of engineering and scientific fields. Students receive a degree in geology, physics or any other subject offered by Mines with a computer science minor. The minor represents three upper division computer science classes.

Mines is making progress toward a full degree in computer science, but lack of equipment and software have made it difficult to keep up with advanced computing in the ever-changing world of computers. The effect has been felt all over campus, and one group has sought to rectify the situation.

Under the direction of Dr. Sam Adams, head of the Geology and Geological Engineering Department, a network of computers has been installed in Berthoud Hall which links special computer laboratories with faculty and staff offices, and to the campus computing center. To further aid the transition, the department hired Dr. Bob Bruce (PhD. '88) to coordinate the purchase of equipment and software, and to train people to use everything.

With money tight in both the department and the school administration, Adams and Bruce approached private industry to fund the conversion to computers. A number of companies have donated equipment or software to solve the computer deficiencies at Mines, and by doing so, corporations have brought Mines along much faster and with more expertise than coul hoped for in a less traditional ma Corporate donations to Mines are new, but with firms like IBM, Arco Terrasciences, MINEsoft and othe Adams and Bruce have been able coherently configure a system wh fits their needs best.

The firms have given generous and the results have been favorabl far (see story on page 3). If you h a computer at home or at the offic you can understand the position t Geology and Geological Engineerin Department faced; they needed to quickly come up to speed on the puters, yet they didn't want to be with a computer system that would outdated in a few years. The inno tive approach they have taken ens they will be able to expand and ch the computer network as their nee change without being strapped to outmoded and outdated system. porate support by many alumni ha made the all the difference.

However, this leaves the depart somewhat vulnerable to the idiosyn crasies of future development of th computer system.

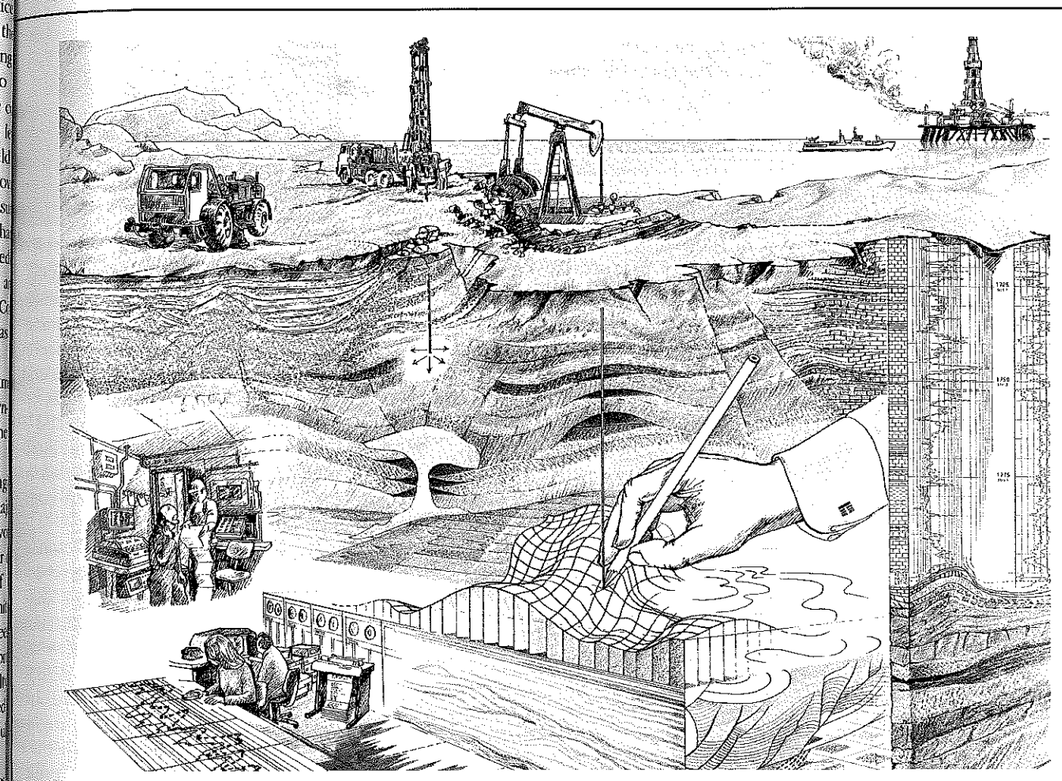
The Geology and Geological En neering Department has taken a m initiative, but there is still a lot of w to be done across campus for othe partments which are still in need of computing facilities. Furthur comm ments by private industry could spe the switch to better computers, or p vide badly needed training for facul Funding for the school's overworke and overused computing center wo go a long way.

If you look at computers as device to aid teaching, then it's easy to see h the availablity of computers would change the way people teach. In the ture there will probably be fewer rote tests given at Mines, and more tests given where a student will have to d rectly apply what he or she has lear even if they use a hand-held calculat According to Dr. Adams, students are moving from campus to industry and mediately using what they have learn at Mines. Let's hope that is our comm goal.

Ellen Glo

A PILOT PROGRAM MOVES INTO THE MAINSTREAM

by Dr. Robert Bruce



Terrasciences Graphics

Computing in the Geology and Geological Engineering Department

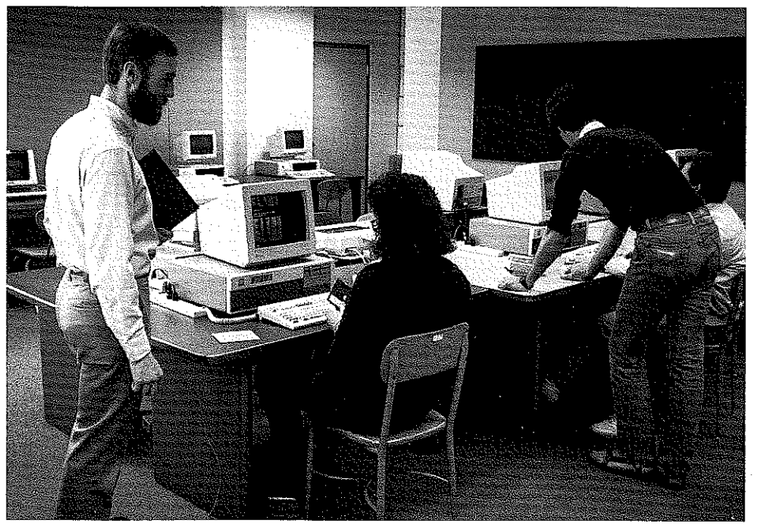
Geology as a science has changed dramatically from a discipline focused on describing the tremendous diversity of earth materials, and processes responsible for their formation, to a discipline that is also exceedingly quantitative, armed with massive data resources and computational tools to test and explore the validity of geologic concepts and predictions. This does not mean for a minute that field and laboratory studies and fundamental geoscience and geoengineering courses are in anyway diminished, simply that we now have new tools to accomplish traditional objectives.

These changes have helped blend the science of geology with the traditionally more quantitative geological engineering components of the Department of Geology and Geological Engineering at Mines. This evolving ability to solve quantitative problems has arrived at a most opportune time. The rapid increases in personal computer performance and decreasing cost allowed the department to take advantage of the Berthoud Hall renovation project to re-allocate laboratory space and equip specialized labs with new computers and peripherals.

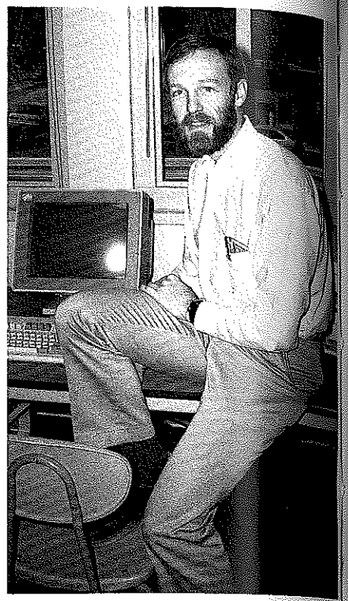
The new computer network that joined DOS and Mac labs with faculty and staff offices has proven to be a wise investment. The network permits efficient use of the department's growing software library, provides ready access to printers, supports file transfers between DOS and Mac computers and improves access to the campus computing center. In addition to the network, four faculty received PCs, four Macintosh and seven DOS 386 lab computers plus a laser printer and an image scanner were acquired during Spring 1989. The resulting facility has proved to be manageable, easy to use, even by the less computer literate and very capable of supporting the varied needs of both classes and individuals.

I was hired in September 1988 to manage the overall system design and installation, research software solutions, train faculty and students in the use of the network and the software it supports, and maintain the increasingly complicated computing facility. I have studied and used many kinds of computers in diverse settings since the early '70s including my PhD. ('88) work at Mines. I have been able to combine my geologic background and computing skills to determine the department's needs, and translate them into solutions that match the developing knowledge base of faculty and students, diverse program priorities and computing resources.

The hydrology program was the first to use the computer labs on a regular basis. Soon classes in diagenesis, geo-



Dr. Robert Bruce works with students in the computer laboratory within the Geology and Geological Engineering Department. A large percentage of the equipment has been donated by corporations and alumni. (E. Glover photos)



Dr. Robert Bruce

logic data analysis, geographic information systems, exploration geochemistry, reaction path modeling, mining geology, and geotechnical engineering were added to the list. By year's end classes in petrology, petrophysics, structural geology, stratigraphy and basic analysis, mineralogy, field methods, and the introductory program will be taking advantage of the new computing resources.

Graduate and faculty research has also benefited from the improved computing tools. Not only have the analytic, computational, and visualization tools expanded the horizons of what can be accomplished, ready access to capable word processing, spread sheet, data base and graphic design programs have increased the scope of what is attempted and the quality of the resulting product. Improvements in the computing tools and skills of the office staff, expanded use of electronic mail to communicate across campus and across the world, and automation of the budgeting and collections management processes have contributed to our collective productivity.

Progress and success in this endeavor to expand the computational resources of the department and the computing ability of our graduates results from the efforts of many individuals and companies. Derek Wilson and his staff in the Mines computer center have over-extended themselves repeatedly to help design and implement this program. Hardware system design, installation, and service has been provided by Computer Aided Business Solutions (CABS) of Golden, Colorado, a company owned and operated by CSM alumni. CABS has provided prompt and effective on site service; and provided replacement, loaner, and evaluation equipment to a degree that clearly makes them a partner in the project.

Mike Norred, president of MINEsoft and another CSM alum, has provided several copies of his company's product TECHBASE, a geological engineering data base, data analysis, and graphics program to the department along with training for several CSM faculty and students. Individuals are already planning to use TECHBASE to help solve hydrology, engineering, exploration, and mining problems and we are just getting started.

Dick Banks, president of Scientific Computer Applications of Tulsa, Oklahoma, and yet another CSM alum, has given copies of Mapping Computer System (MCS) to the departments of Geology and Geological Engineering and Geophysics. In addition to the software gift, Dick has visited campus to install and train several faculty members. He also provided large format pen plotters to help Mines take full advantage of the exciting capabilities of this package. MCS models, analyzes, and displays complex geologic structures in three dimensions faster, more accurately, and with results that more closely match manual techniques than any product in use in the department.

Mike Thacher and Pete Stark of Petroleum Information have devoted much of their time and company resources in the form of data and experience to help build laboratory exercises, support thesis research projects, and give formal presentations on campus concerning data utilization practices in exploration and future trends.

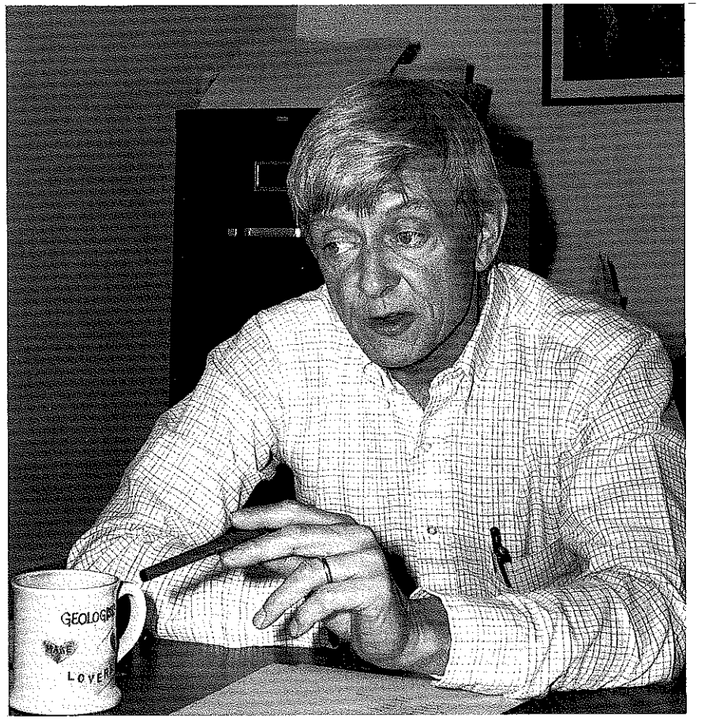
Travis Hudson and David Lafferty of Arco Alaska are working to bolster our growing petrophysics capabilities and bring the department into the Unix work station world by sponsoring a program to provide a DEC Station 3100 and a major petrophysical software package during the spring of 1990. Combined with the hardware and software, the data sets and training provided by Arco Alaska amount to a major effort on their part that will make possible equally impressive gains in the school's ability to conduct modern well log research and industrial education programs.

Jim Reed, president of RockWare, Inc., provided the RockWorks geologic analysis package to the department at a reduced price and has devoted considerable time configuring the software to operate effectively in a network environment. Jim is making numerous presentations to faculty and students to ensure that all are aware of the systems capabilities and are able to take advantage of them.

Peter J. Varney, of TERRASCIENCES, is accelerating the transition into using integrated exploration tools by providing DOS and Unix versions of TerraStation. TerraStation facilitates the interactive use and manipulation of well log and map data to characterize and display sedimentary basins in three dimensions. The regional analysis and graphics capability go far beyond the original goal of finding an appropriate tool to help teach well log analysis methods and provide a capability for presenting and conducting more realistic problems in laboratory exercises.

Jim Demarest, of Exxon Production Research, is an enthusiastic champion of the geologic computing program. Thanks in part to his efforts, Exxon has financially supported the department's computing program over the past two years.

The Joint CSM/IBM Exploration Initiative has been a hot topic on campus for almost a year, and a portion of the $1.7 million of hardware and software has already arrived and is in use. Two IBM employees will take up residence at Mines as part of the initiative: Dr. Richard Norwood will serve as the onsite manager of the joint project, and Dr. George Almasi will be conducting research into the applicability of parallel computing techniques to seismic data processing and the use of medical imaging techniques to exploration.



Dr. Sam Adams, head of Geology and Geological Engineering Department, says the increased use of computers by faculty and students is making a substantial difference in how courses are taught.

The program is intended to explore how best to utilize Unix work stations in resource exploration and extraction, waste site remediation, and training professionals to perform these important tasks. The initiative is a golden opportunity for the school to build a vibrant program that takes maximum advantage of the traditional strengths of Mines, brings the exploration related departments even closer together and provides support for research and training programs vital to our client industries.

The department has nine faculty members actively involved in teaching and research programs that will utilize and evaluate the powerful computing environment envisioned for the Joint CSM/IBM Exploration Initiative. The ability to quickly respond to this opportunity is a result of the department's previous decision to upgrade its facilities and invest the time to maximize its use.

Equally important are the alumni and company representatives who have clearly expressed how important it is for the department to stay abreast of advances in computer technology and the computing skills demanded in the workplace. These observations have often come with concrete suggestions as to what facilities and experiences would best serve our students. The faculty deserves credit for allocating declining department resources to fund this expensive proposition and see it through with their time and energy to guide and manage this revolution. All friends of CSM are encouraged to stop in next time you are on campus to see the rejuvenated Berthoud Hall, the new computing facilities and the excitement this revolution in geology and geological engineering is generating. ▲

FRED POETTMANN PIONEER, TEACHER AND FRIEND TO MANY

by Ellen Glover

Dr. Fred Poettmann, world recognized pioneer of petroleum engineering, says his intent upon leaving college in 1942 was to work a little in industry and then return to a university to teach, but life took a few turns and he didn't formally return to teaching until 1983 when he began a second career as a university professor at Mines.

This unassuming statement does not begin to describe an extraordinary career in the petroleum industry and an insatiable thirst for knowledge. Poettmann spent more than 30 years with oil companies developing enhanced oil recovery techniques that now are viewed as the basis of the industry.

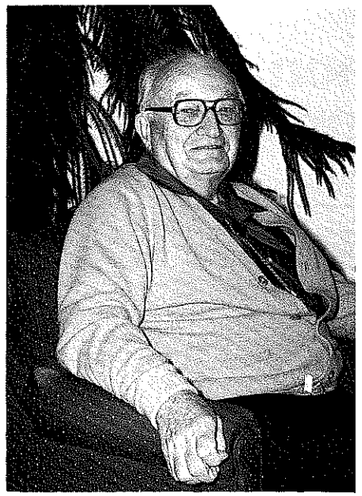
Poettmann has a drive and enthusiasm for life that are very evident. He is a complex, intelligent man, yet to talk to him you wouldn't know that he has written or co-authored more than 10 books and 40 articles, or that he holds about 30 patents. His awards are impressive and include being elected to the National Academy of Engineering. He does not seem phased by any of his activities; he continues to be focused on the quest for more knowledge and being able to teach others "plain common sense and good engineering."

Overcoming adversity

When Poettmann was two years old he had polio, but he has never let it hinder him in any way. He played with other boys who were not handicapped; when they went sledding he had his dog pull him back up the hill instead of walking. He tells stories about playing baseball and compensating for a weak leg, and he has played golf and been an avid fisherman. He and his wife maintain a mountain cabin near Buena Vista, Colorado along the Arkansas River, a favorite spot for dropping in a fishing line.

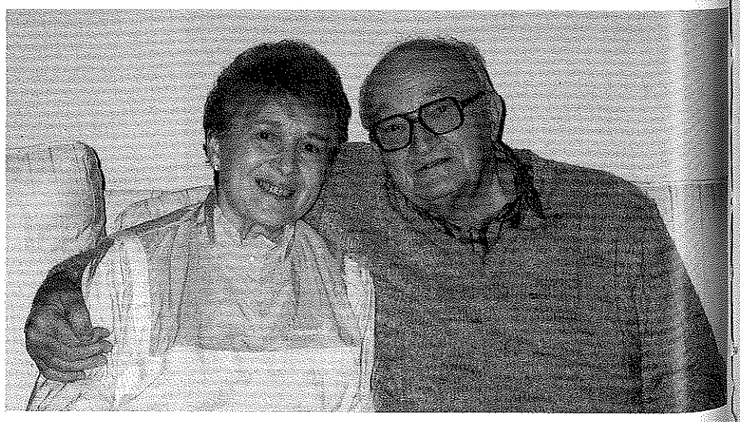
About a year ago he was involved in a car accident, and while he was not badly hurt, the accident has triggered some health problems which have made Poettmann feel less mobile.

Polio had a little to do with Poettmann becoming an engineer. He says he was an average student until the ninth grade when his father took him aside and said he would have to use "brain over brawn" if he were to succeed in life. At the time he was attending a technical high school in Cleveland which awarded a full college scholarship to the best student upon graduation.

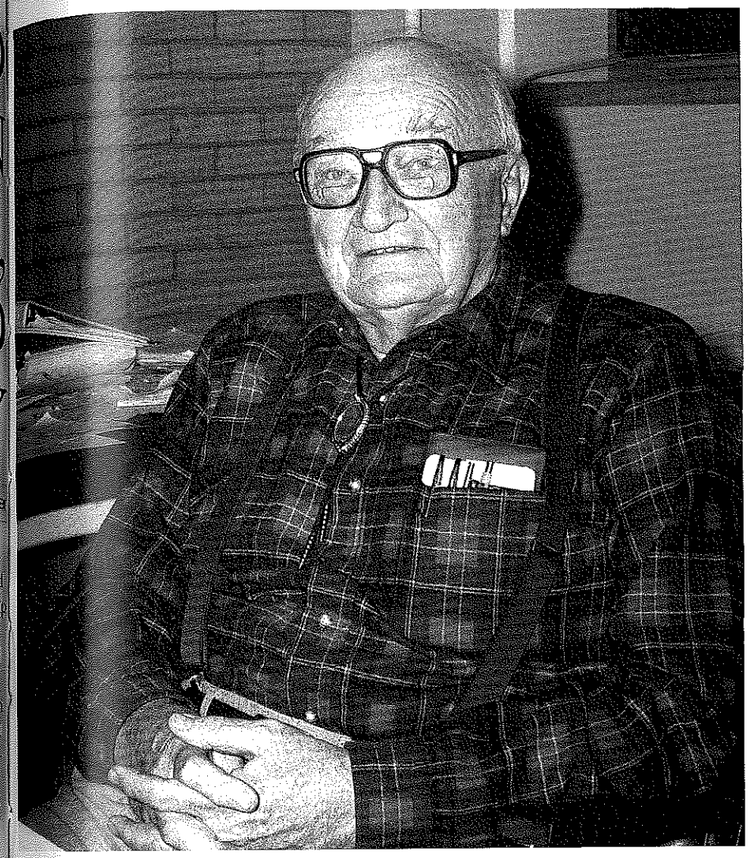


"I changed my attitude and applied myself; I took additional courses including mechanical drawing, and even though my grades were much better, I was the school's salutatorian, not valedictorian. I accepted a scholarship to Case Institute of Technology in Cleveland and majored in chemical engineering," he said.

Later Poettmann went on to study with Dr. Donald Katz, a world-recognized chemical engineer who organized and managed the production research department at Phillips Petroleum Company before returning to the University of Michigan in the 1930s.

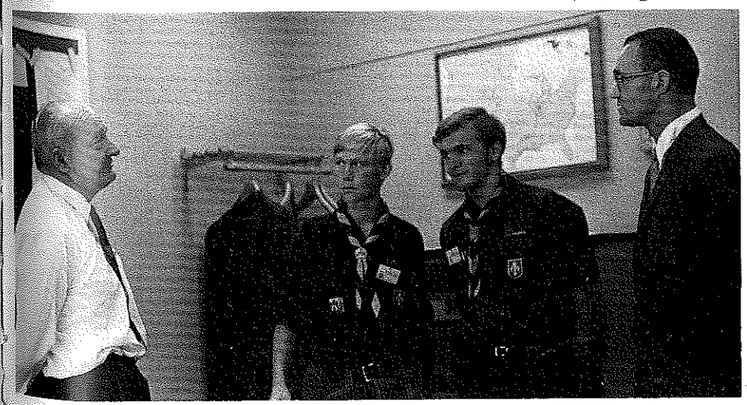


Anna Bell and Fred Poettmann



Early research in oil recovery

Poettmann left the University of Michigan in 1946 and joined Phillips in Bartlesville, Oklahoma in the company's production research division. "Initially I was assigned to a group of physicists as the only engineer, a move I resented at first because I thought I should be with a young engineering division. It proved to be a good move because the physicists had some great ideas, but hadn't tested them yet. I took their theories and applied them to situations in the field; I was given a lot of exposure to field work and applying research directly to field tests. I kept in touch with the engineering groups within the company, and a number of my patents date from this research," he explained.



Dr. Poettmann talks with two Boy Scouts touring Marathon. With them was Rudy Salzberger, a machinist at Marathon who was active with the Scouts. (Marathon Oil photo)

While at Phillips he worked in the area of hydrocarbon phase behavior, natural gas engineering, and production operations with an emphasis on lifting reservoir fluids optimally through the wellbore to the surface. Eventually his experiences in phase behavior was directed toward enhanced oil and gas recovery from underground reservoirs. Poettmann was also involved in testing natural gas wells where he continued to put theory into practice, his forte according to his colleagues.

In December 1989 the Petroleum Engineering Department organized a festive 70th birthday party for Poettmann, and as part of the celebration his colleagues were asked to contribute letters recalling their experiences with Poettmann. Included in that compilation was a letter from Andy Bertuzzi, a friend and colleague, who recalled a research and development division meeting at Phillips in 1950:

> "One of the young production department engineers was giving a report on productivity of oil wells. During the presentation the engineer began to get questions from Herman Kaveler, technical advisor to the vice president, for which he had no answers. As I recall, Herman began to pose the questions to you. You stepped up to the blackboard, defined the problem and a course of study including collecting field data to seek a solution. Before you left the blackboard Kaveler had requested that R&D assign you a project to undertake the study."

Ever the professor

Anna Bell Poettmann, Fred's wife of more than 30 years, says her husband feels fortunate to be among the pioneering group of engineers and scientists at Phillips and Marathon Oil Company who were able to work out theories about injecting especially designed fluids into reservoirs to displace the hard-to-get oil, which is also known as enhanced oil recovery. This

includes air (for in-situ combustion), steam, hydrocarbon solvents, polymer, and miceller-polymer injectants.

"Fred thinks that today's young engineers probably won't have the experiences in research that he and his age group had. Fred is a driver, a hard worker, and he always drove the people he worked with. He is a tough, German professor and that's the kind of person he was as a manager in research or teaching," she says with a smile.

Teaching has been a lifelong ambition for Fred, according to Mrs. Poettmann, but teaching didn't pay enough to support a family; Fred's first wife, June, died of leukemia nine weeks after their daughter, Trudy, was born, one of life's little twists Poettmann refers to.

While Poettmann was at Phillips he taught extension courses for Oklahoma State University in natural gas engineering, thermodynamics, heat transfer, and fluid dynamics. Many of his students were Phillips engineers who couldn't return to college for advanced degrees, and many of them became, and continue to be, friends.

Poettmann never gave up the idea of teaching, and in place of an academic setting, he began to nurture and follow the progression of people he supervised or met through professional associations. He joined the Society of Petroleum Engineers in 1946, and has served as director, chairman or member of more than 20 national committees since 1962.

One of the original researchers at Marathon, Dr. Barney Gogarty, comments on Poettmann's inspiration to present and publish papers:

> "Typical of the way you helped me (at Marathon) was how you saw to it that the original Maraflood papers were presented and published. You always saw that Marathon allowed me to be active in SPE by letting me serve on various committees. You plowed the ground for me and others in Marathon to serve as distinguished lecturers, one of the highlights of my career..."

Gogarty added that Poettmann encouraged him to become an adjunct professor at the University of Denver, an extension of Poettmann's idea that teaching part-time was of value to the individual and to Marathon. "Your feeling that teaching keeps the individual's mind alert was certainly true in my case. I enjoyed my seven years of teaching which would not have been possible without your direction and support," he concluded.

For his dedication to the Society of Petroleum Engineers, and his continued encouragement to professionals, young and old, Poettmann became a distinguished member in 1983, and an honorary member in 1985.

Moving on to Marathon Oil Company

Poettmann left Phillips in 1955 for a once-in-a-lifetime opportunity at the Ohio Oil Company (later renamed Marathon Oil Company) which was gearing up to develop a research center at a yet undetermined site.

Poettmann and his colleagues were given the unusual opportunity of deciding what research to pursue and where to locate a first-class research facility. As associate director of research, he was responsible for hiring and training most of the engineers and scientists to staff the new laboratory, and many of those people later became leaders themselves either in Marathon research or production.

Marathon selected a former chicken ranch in Littleton, Colorado as the site for the research facility; Littleton was chosen to attract young engineers to the mountains, and for accessibility to Denver's airport.

Anna Bell Poettmann tells the story that they were the first family to settle into a new home in Littleton. "Our house was headquarters and even a spot for coffee breaks enroute from hotels downtown. Very early one morning the president of the company and his wife came to my house before returning to Ohio. There were very few restaurants in Littleton at the time, and none near the research center. That's the fastest I got dressed, let me tell you!" she laughed.

Chemical flooding of an oil reservoir

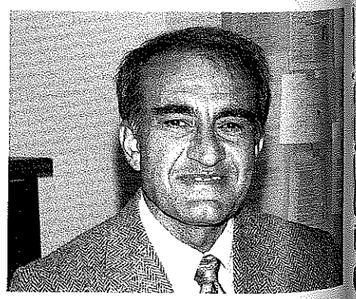
Getting in on the ground floor was a dream come true. Fred's habit of working hard and for long hours helped Marathon engineers to develop a method for rejuvenating depleted or nearly depleted oil reservoirs through chemical flooding which was patented under the name "Maraflood."

Natural fluids such as water and gas leave a large portion of oil in the reservoir even under the best of conditions. Because these fluids are immiscible with oil, the oil resists being displaced from the rock pores. Also, these fluids have densities and mobilities that are incompatible with oil. For this reason they sweep only certain portions of the reservoirs and finger past the oil. The improved recovery method known as chemical flooding adds chemicals to the water to overcome some of these problems.

In chemical flooding, Poettmann and his colleagues experimented with polymer flooding, and micellar-polymer flooding. Detergent-like chemicals are used to free residual oil trapped in reservoir rock. Synthetic detergents and soaps have an ingredient known as a surfactant, or surface-active agent. Surfactant molecules are dually attracted to both water and oil. They thus have the ability to reduce surface tension and to break up oil into tiny droplets that can be drawn from rock pores by water. A surfactant-water solution is injected into a reservoir to release the oil, and then polymer-thickened water is injected to push the oil toward producing wells. This is the basis for the Maraflood process.

Launching a new product

Dr. Hossein Kazemi, associate director of production technology at Marathon, says the micellar-polymer flooding process brought Poettmann worldwide recognition for pushing the field tests of the process. Dr. Kazemi also is an adjunct professor in the Petroleum Engineering Department at Mines.



Dr. Hossein Kazemi, friend and colleague to Fred Poettman

Poettmann was called back to the corporate office in Findlay, Ohio to license and market the process for several years, finally returning to the Denver research center where he retired in 1983.

"When the price of crude oil dropped, it affected the enhanced oil processes Fred discovered. It became hard to market the process because it is an expensive recovery technique, but if the economic situation were to change the process is still a valid means of extracting oil from the ground. The pioneering work done under Fred's direction will be applicable again—it is a great contribution," Kazemi explained.

Kazemi said he was introduced to Poettmann through the researcher's textbook, *Handbook of Natural Gas Engineering*, first published in 1959 and in continous publication since then. Kazemi said he later met Fred at a conference where they developed a professional relationship that has become a warm friendship.

"Fred is tremendously full of energy, and he loves applied engineering. He reads and criticizes in a very constructive way, and at the age of 70 he is the same as when I first came to work for him when he was 50 years old. He has drive, but he also has a big heart. He knows and remembers all the people he has met, and when he senses someone is bright and capable he stays with the person to help him achieve in life.

"Even if it has been many years since he has seen someone he picks up where they left off professionally; he brings a great deal of effort in nurturing someone professionally and continues to seek out the people he has helped . . . an unusual trait in a man," Kazemi recounted.

Kazemi said he began his career in petroleum research and deliberately sought a job at Marathon for the opportunity to work for Fred Poettmann; he now holds the job Poettmann had when he approached Poettmann 20 years ago. He says he dearly loves Fred and calls him an inspiration to everyone who works with him.

Nurturing family, students, and gardens

This pioneer brings the same drive to his family and other interests as he does petroleum engineering. For many years Poettmann kept a garden in a community plot at Marathon; his was an intensely cultivated garden and he was teased by fellow employees for waging war against the local rabbits. "We had two plots by the research center and I raised every kind of vegetable. I also had an orchard at our house in the BowMar South neighborhood of Littleton, and when we moved to Findlay we had the sweetest Queen Anne cherries and the prettiest color of peaches," Poettmann recalls.

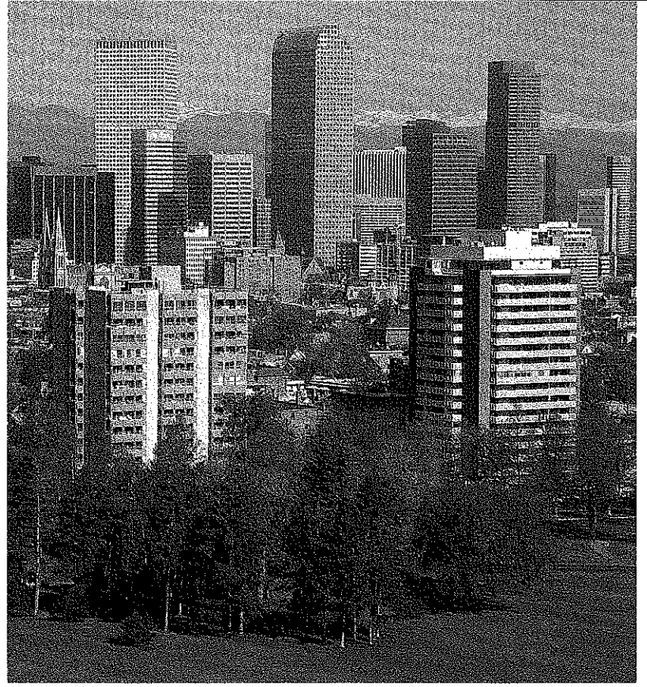
When the Poettmann's daughter, Trudy, and son, Phillip (Mines BSc. CPR '85), took an interest in figure skating and hockey, Poettmann plunged into the local recreation scene and became a member of the South Suburban Metropolitan Recreation and Park District.

"Littleton needed open space and parks including a public golf course. I became chairman of South Suburban and took a lot of heat for some of the proposals; people were really angry about buying land for bike paths, parks and setting land aside for the future, but later the same people who called to complain called back and apologized. They liked the way things turned out," he said.

A friend and neighbor from Littleton, Louise Mann, wrote to Fred in December for his birthday, and her comments summarize many of the feelings people have about Poettmann as a friend:

> "When you first moved into BowMar South and I learned you had a PhD. in some far-out field, I ruled out the possiblity of you as a friend. Then when you barked at Anna Bell, I thought, 'well here's a hard-headed Dutchman I'm going to avoid like the plague.' How wrong I was!
>
> "Your image suffered a little when Phillip got in a little trouble along with other neighborhood boys, and you laughed a little, after swearing first, of course. Then I found out you got your hands dirty gardening and even gave away vegetables. However, yours had to be the largest and the best. The perfection was tarnishing a tad.
>
> "The veneer had now cracked and humaneness shone through. Conclusion: Fred Poettmann is a marshmallow and the exterior is all bluff. Thank goodness I wasn't too late schmart."

Poettmann has retired as a professor at Mines, but he continues to supervise the research his graduate students are completing even though he doesn't receive a salary. As he heads out the door of his home in Littleton for his office on campus, Poettmann expresses concern for one student's thesis which needs attention. For Dr. Fred Poettmann there is still work to be done, still a class to teach, still worlds to explore. ▲



Colorado's Clean-Air Fight:

Mines Starts Up a High-Altitude Engine Lab

On a clear day, you can see forever . . . but if you are stuck behind a diesel truck or bus in rush-hour traffic in Denver the view is less than appealing. The breathtaking view of the Rockies is sometimes choked by a visible brown cloud—the hazy crud that smudges our mountain views and spoils the area's reputation as a good place to live and work.

Denver is both blessed and cursed by the mountains to the west; the mountains add a majestic backdrop to the metropolitan area, but being at high altitude increases the number of days Denver suffers from air pollution. Private industry, local and state government and the scientific community have been working since the early 1980s to find a workable air quality strategy.

Colorado Governor Roy Romer has targeted air pollution as one of his top priorities; he wants to cut the Front Range's brown cloud in half by the turn of the century, and one of the components of his plan will be centered at Mines. In cooperation with the state of Colorado, the Colorado Department of Health (CDH) and the Regional Transportation District of Colorado (RTD) the School of Mines has established the nation's first research center on the effects of alternative fuels and new engine designs on emissions from heavy-duty vehicles at high altitudes.

According to Dr. Mogens Henriksen, head of the Engineering Department, the Colorado Institute for Fuels and High-Altitude Engine Research (CIFER) has been funded at $1.9 million by a coalition of government and private industry groups. It will be built in two phases: In the first phase, a campus laboratory is under construction for research on alternative fuels to be conducted by Mines faculty. Mines' 600hp heavy-duty emission testing lab is being designed and will be constructed at RTD's maintenance facilities in Denver.

In the second phase, the entire laboratory will be moved to the Mines campus and undergo significant expansion. At press time a location had not been selected. Whatever research develops will help Denver and other high altitude cities like Albuquerque, Phoenix and Salt Lake City deal with air pollution from motor vehicles.

Henriksen said researchers will identify fuels and engine components which will mitigate the atmospheric contamination attributable to heavy-duty vehicles. The capacity of new engine and fuels technology can be measured accurately in a laboratory setting which may lead Mines scientists to fuel-saving and emission-reducing measures.

Denver's affection for cars

Denver's air pollution problem is two-fold. During the winter, high levels of carbon monoxide principally from automobiles are observed during times when air inversions exist. The brown cloud, which limits visibility, is composed of minute particles and droplets as well as light-absorbing gases such as nitrogen oxides. Brown cloud emission sources include fugatic dust, fireplaces, power generation facilities and diesel engines. The Mines research program will attack both of these problems.

Carbon monoxide—the invisible poisonous gas

Carbon monoxide, an invisible and odorless gas generated during incomplete combustion by motor vehicles and wood-burning, has been the main culprit in Denver's skies. The Denver area's air contains about 20 percent less oxygen per cubic foot than air at sea level. Fuels tend to burn less completely at higher altitudes, releasing extra carbon monoxide into the atmosphere. About 90 percent of the area's carbon monoxide buildup comes from motor vehicles and wood-burning.

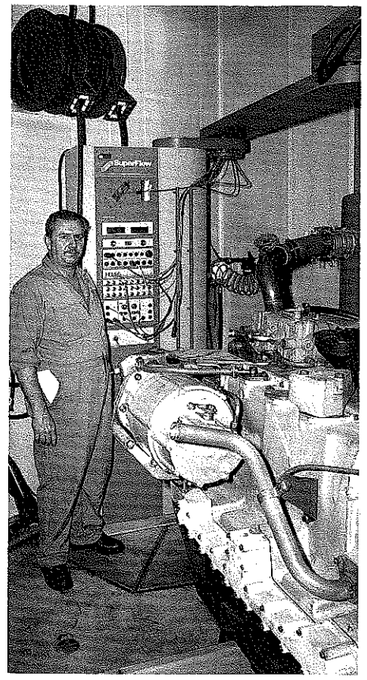
During the summer, turbulent weather clears the skies. But during fall and winter, because Denver sits in a basin adjacent to high mountains, air temperatures may get warmer with elevation instead of colder.

The warmer air temporarily traps the colder, polluted air close to the ground in an inversion, causing air-pollution meters to spike, especially at rush hours.

Recent studies by Colorado's Department of Health show that levels of carbon monoxide in the Denver's skies have dropped a remarkable 36 percent since 1983. A number of pollution-fighting strategies including the sale of cleaner burning oxygenated fuels, stiffer vehicle inspection and maintenance programs and wood-burning bans during high-pollution days are helping the metro area.

State officials say the approach is working. They are especially pleased with the oxygenated fuels program,

RTD busses loaded with commuters hurry past the capitol building in downtown Denver. The focus of experiments at Mines' new high-altitude engine laboratory will be diesel engines; RTD is a contributing partner in this research. (E. Glover photos)



An RTD employee stands by a computer and a diesel engine at RTD's new maintenance facility in Denver. The computer simulates actual road and load conditions that a bus would incur while driving through Denver, and then the engine can be tested to see how it meets fuel efficiency and air pollution standards.

which beginning in 1987 was the nation's first to require the sale of gasoline laced with either methyl-tertiary-butyl-ether (MTBE) or ethanol. The plan was adopted by other western cities this season and is being reviewed by Congress as lawmakers rewrite the federal Clean Air Act.

The success of oxyfuels has been one factor which has helped the School of Mines bring the high-altitude laboratory to Golden since oxyfuels demonstrate how new fuels can improve the environment. CIFER plans to work on futher oxyfuel developments in conjunction with the Solar Energy Research Institute (SERI) and the Colorado Department of Health.

Diesel emissions

Mike Graboski, associate director of the new institute, says one of the first tasks of the engine lab will be to work on M-diesel, a fuel recently refined by Dr. Reed from waste vegetable oil and methanol (see "French Fries to Fuel" story). Mines researchers will compare it to available diesel sold in Colorado, then compare it to other diesels to test relative emissions.

The Environmental Protection Agency (EPA) has recently published a set of stringent heavy-duty diesel engine emission standards which will become effective in the early 1990s. Today's trucks and buses operating on conventional diesel fuels cannot meet the published standards. Research today is aimed at development of cleaner burning fuels such as methanol and use of particulate filters to scrub the exhaust gases.

CIFER is working closely with RTD on a variety of new "designer" fuels to lower particulate and nox emissions which contribute to the brown cloud. The associate director said he expects the downtown heavy-duty laboratory to be functional by the second quarter of 1991, which will be able to handle the largest diesel engines on the road—up to 600 horsepower. ▲

FRENCH FRIES TO FUEL?

by Ellen Glover

A School of Mines chemist has mixed common cooking oil and methanol to produce a fuel which has been successfully tested in a Denver Regional Transportation District (RTD) bus.

Dr. Thomas Reed, a professor in the Chemical Engineering Department, says 30 percent of the mixture added to diesel fuel will reduce tailpipe smoke, or it can be used as a substitute for diesel.

Reed took a gallon of waste oil from a Golden fast food restaurant and mixed it with methanol to form a fuel that is 10 percent oxygen. Reed said he and a partner spent two weeks converting two barrels of waste grease to fuel. "We added the methanol and cooked it. All the nasty parts sunk to the bottom, and we got the most beautiful yellow oil," he said.

He then contacted RTD which tested 100 gallons of "M-diesel" in their buses by putting a bus in a chassis dynamometer under load conditions.

"Three fuels were tested: ordinary diesel; a blend of 30 percent 'M-diesel' and regular diesel; and then 100 percent 'M-diesel'. As far as the tests were concerned there was essentially no difference in the operation of the engine. We would have a hard time saying whether the engine worked a little better on the M-diesel or a little worse; it's just within a statistical measurement," Reed said.

Reed also said the fuel was tested for opacity, or tailpipe smoke, and it clearly reduced the percentage of smoke.

The professor said he feels like they have overcome two hurdles: can they make the fuel from waste fats, and is it as good or better then ordinary diesel? "When you are concerned with smoke and pollution, M-diesel is better than ordinary diesel," he said.

The next step is to produce another 100 or 1,000 gallon batch. Reed is setting up a company to go into business to produce the fuel. He says that eventually he needs a batch plant where 1,000 gallons could be mass produced. He foresees producing the fuel and distributing it around the country so people can test it further. He hopes to develop a continuous process where you "would pour in the waste fat at one end and out comes the diesel at the other end," something that might be six months to a year away.

Reed says the drive to find alternative fuels came out of the diesel fuel shortages of the 1970s when farmers thought there would be a fuel shortage just when crops had to be harvested. Fuels were made from cotton, sunflower seed or soy bean oils, but these fuels didn't work well because they are too heavy, don't burn well and begin to clog engines and pistons.

Reed said the introduction of M-diesel ties in well to the Mines high-altitude engine laboratory to be built in Golden because "in principle the high-altitude engine lab is available for automotive and diesel engines, but my perception of the diesel problem in Denver is that it hasn't been solved where the automotive problem largely has been solved with cleaner fuels, and newer cars which meet air quality standards. We haven't done anything about diesel," he explained. M-diesel will probably be one of the first fuels tested in the new laboratory.

Reed has devoted the past two decades at Mines and the Solar Energy Research Institute, also in Golden, to the search for cleaner alternative fuels. ▲

THE IMPACT OF AIR POLLUTION ON YOUR HEALTH

by Franklin D. Aldrich, M.D., PhD.

Looking east from atop Table Mesa in Golden you can see the sun's yellow disc break above Denver's high-rise skyline. Between you and the city's center there is haze this morning, thickening by the minute. As solar energy warms the ground and the downtown buildings, surrounding air heats up too, and rises by convection. Cooler upper air descends to replace it. You are watching a thermal inversion forming, which effectively clamps a lid over Denver, trapping the myriad ingredients of an infamous "brown cloud," very familiar to Front Range residents.

The brown cloud contains a variety of substances, including particulates, hydrocarbons and carbon monoxide from engine exhaust, dust, photochemical reactants and aerosol-scattered sunlight. It irritates your nose, eyes and throat because it contains nitrogen dioxide, nitric oxide, aldehydes, peroxyacetylnitrate and ozone (both powerful oxidants and irritants), sulfur dioxide and a complex mixture of other chemical species which are harmful to health.

"Anthropogenic" is a seventy-five cent word used by experts to denote those components of polluted air which originate from people and their activities. Mobile and stationary sources give rise to anthropogenic air pollution. Typical stationary sources include chimneys, "smokestack" industries, power plants, or any fixed generator of airborne contaminants. Stationary sources are outnumbered by mobile pollution sources—typically, motor vehicles, aircraft and trains.

Pollutants may be either "primary" or "secondary." The latter arise from atmospheric chemical reactions; the former are released from point sources, such as a smelter stack. Natural sources of air pollution include volcanoes, fumaroles, forest fires, soil erosion, ocean spray, and organic volatiles given off by vegetation and microorganisms, and by decaying animal and vegetable matter. The combined effect of natural air pollutants is minute, however, compared to that from manmade contaminants.

As generators of airborne hydrocarbons, nitrogen oxides, carbon monoxide, and particulates, cars and trucks probably have had more impact on air quality than any other factor in the past century. Although pollution control methods can reduce some automotive engine emissions to legally "acceptable" levels, they do so only in compromise. Control of carbon monoxide and hydrocarbons, for example, is done at a cost of increased nitrogen oxide emissions. Power output and fuel economy are degraded by emission control measures used in modern gasoline engines. High altitude compounds this problem, because lighter-than-sea-level air reduces engine efficiency, even in the absence of power-stealing pollution devices.

Ecological effects

Anthropogenic gases and organic volatiles play a significant role in global warming: the "greenhouse effect." Not unimportant also is rain acidification, resulting from the release of sulfur and nitrogen oxides from fossil fuels, particularly high-sulfur coal and from internal combustion engines. This "acid rain" lowers the pH of lakes and rivers, particularly in midwestern and northeastern regions. Acid rain also accelerates outdoor equipment failures caused by rust and corrosion, and erodes concrete structures such as buildings, bridges and highways. Air pollution thus indirectly increases maintenance costs.

Health effects of the brown cloud

Exposure to urban air pollution is usually continuous, rather than intermittent. Each breath you take brings another charge of air laden with low levels of contaminants into your respiratory tract. Tissues in the respiratory tract are moist, thus presenting an optimum surface for trapping particulates and soluble materials. Pollutants may be liquid or solid aerosols, or gaseous. Deposition of larger particles may occur in the upper part of the tract (nose, pharynx, trachea); smaller aerosols and gases may be absorbed in the lower lung regions. Young children and the elderly may be most susceptible to adverse effects of air pollution, as are those persons with pre-existing heart or lung diseases, allergies, asthma, and in those who inhale tobacco smoke regularly. Indeed, an increased incidence of fatal asthma attacks has been traced to air pollutants. Air flow reduction in smaller airways, bronchial inflammation, increased phlegm production and cough, reduced infection resistance, and diminished exercise tolerance are some of the more prominent effects of chronic exposure to air pollutants.

Urban air may contain trace levels of various carcinogens, such as beno(a)-pyrene, but the significance of this in actually causing a true increase in the incidence of lung cancer among urban dwellers is as yet undetermined.

Carbon monoxide is a significant component of polluted urban air, because it exerts its toxic effects unselectively in all who inhale it. This gas combines avidly with hemoglobin (a red, iron-containing, oxygen-transporting substance in red blood cells), forming carboxyhemoglobin, with an affinity almost 250 times greater than that between oxygen and hemoglobin. The oxygen-carrying ability of hemoglobin thus combined with carbon monoxide is blocked for at least 24 hours after all exposure to carbon monoxide ceases.

Smokers are at greater risk from carbon monoxide, because those who inhale smoke regularly have increased levels of circulating carboxyhemoglobin to start with; inhaling the gas simply makes that situation worse, for it reduces further the oxygen-carrying capacity of the blood. Excretion (elimination) of carbon monoxide proceeds much more slowly than its absorption. Thus, it is possible to build up significant amounts of carboxyhemoglobin, for example, while stalled in heavy traffic. Features of early carbon monoxide poisoning include headache, slowed reaction time, and drowsiness, all of which are undesirable if you are at the wheel of a car!

Life at a mile above sea level does nothing to lessen the impact of air pollutants on health. Rather, low oxygen content of blood at high altitude compromises everything further. And, the higher up we go, the less we are able to compensate for diminished hemoglobin oxygen-carrying capacity, or to deal with lung diseases in general.

Where are we headed?

Although it may seem obvious that an internal combustion engine operating at a mile or more above sea level is destined by physical laws to wheeze along inefficiently, starved for oxygen and compression, it is apparent also that much fundamental research in fuels and engine design needs to be directed toward engine dynamics at high altitude. Power optimization and reduction of toxic exhaust components need to be addressed with equal vigor. Present-day "patches" for exhaust stream treatment include fresh air induction into engine exhaust ports, catalytic conversion of carbon monoxide and hydrocarbons to carbon dioxide, and downward adjustment of spark timing and compression ratios to minimize nitrogen oxide formation. These measures are tradeoffs, at best, between pollution control and maximum engine efficiency.

Modern engine fuels are hydrocarbon-based, for reasons of cost and convenience. Methanol-fueled engines have been used in race cars, at lean air-fuel ratios, with good efficiency and lower hydrocarbon, carbon monoxide, and nitrogen oxide emissions than is realized with gasoline-powered engines. Tradeoffs with methanol as an engine fuel include higher fuel costs, lower miles-per-gallon, and formaldehyde in the exhaust stream. Formaldehyde is a noxious chemical because it is a potent respiratory tract irritant and a probable human carcinogen.

Catalysis research for methanol-fueled engines may lead to ways of eliminating formaldehyde from the exhaust stream. If this can be achieved, then the advantage of methanol as a low-pollution fuel may outweigh its higher cost.

Hydrogen may prove to be an ideal motor fuel, for water is its only exhaust gas product. Efficiency, storage problems, and cost of production are current limitations on practical hydrogen-fueled engines. The use of solar energy for electrolytic hydrogen production from water, and the coupling of fuel cell technology with electric motors for vehicle propulsion are two areas of current research in hydrogen fuel technology.

The Colorado Institute for Fuels and High-Altitude Engine Research at CSM will be an exciting place to work. The complex challenges of optimizing high-altitude engine efficiency while minimizing, or eliminating, harmful exhaust gases won't be easy or simple, but I'll bet it can be done at Mines!

Franklin D. Aldrich is the manager of the health effects research department at IBM Corporation in Boulder, Colorado. Formerly, he was medical director for Climax Molybdenum Company, and assistant medical director for environmental medicine at M.I.T. Dr. Aldrich is special adviser to the Colorado Institute for Fuels and High-Altitude Engine Research at Mines.

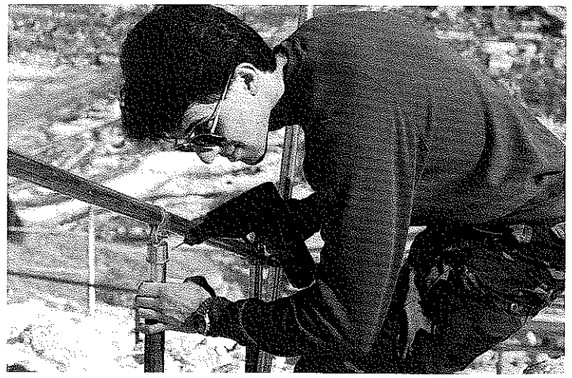
Buy a Bulb and Rebuild the "M"

Mines' Blue Key Club has been busy this year stabilizing and rewiring the "M" on Mount Zion, a project which will totally renovate the electrical system and insure that the white-washed rocks will stay in place. The cost of the project upon completion will be approximately $15,000.

According to Bob Todd, club president and a senior at Mines, the group has been working on the "M" in three stages. At one point students spent a night with the generator at the site after the wind knocked out the power which dramatized the need for the project. In the first phase of the project, students drilled into the mountain and installed rock bolts as a foundation for a support structure. Todd said the student chapter of AIME brought the necessary equipment from CSM's experimental mine in Idaho Springs; their time and effort was a significant contribution.

Mike Todd, a senior and Bob's brother, working on the lighting system.

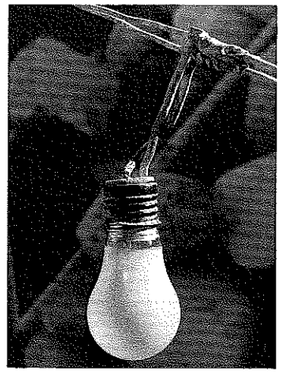
Using tubing from chain link fencing, Blue Key Club members built a support system for the lighting which will save the lights from wind damage. During the final phase of the project, which is expected to be completed by Spring 1990, students will encase all the wiring in conduit and place the bulb sockets in weather-proof boxes.

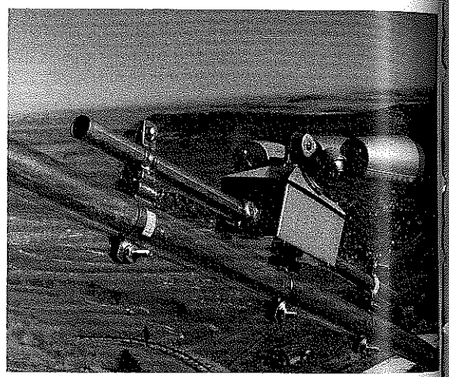


Jonathan Kreb at the "M".

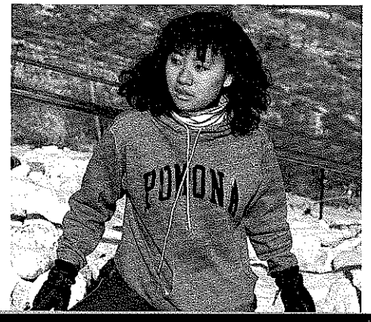
This will eliminate any exposed wiring as there had been in the past.

First lit in 1932, the "M" will continue to glow into the next decade with your help. Blue Key is accepting donations toward the cost of the project and future maintenance. For $32.00 you can "buy" a weather-proof box and bulb, and your name will be inscribed on the box. Club members will send you a thank you note and a chart showing which bulb you bought. Approximately 550 bulbs are available so the supply is limited—act now and reserve your bulb!





Old lighting system (left) contrasted with the new system.



Debbie Kang worked on the project.

A generous donation from the Class of 1952 paid for the all the hardware and new wiring from campus to the "M" so this has been a well-supported alumni project from the beginning. This donation has rectified all the wind damage to the power lines leading to the "M".

Any additional funds collected this spring will be held for a future project; Blue Key wants to encase the white-washed rocks in concrete to prevent them from sliding down Mt. Zion. Todd hopes to purchase and engrave a brass plaque for every class graduated from Mines. The plaques will be placed in the concrete that will encircle the "M".

Todd is also looking for stories, lore and souvenirs of past "M" projects. If you have a special memory of Mt. Zion and would like to share it with Todd, he would like to hear from you. All

Continued on page 39

Reunion Guide 1•9•9•0

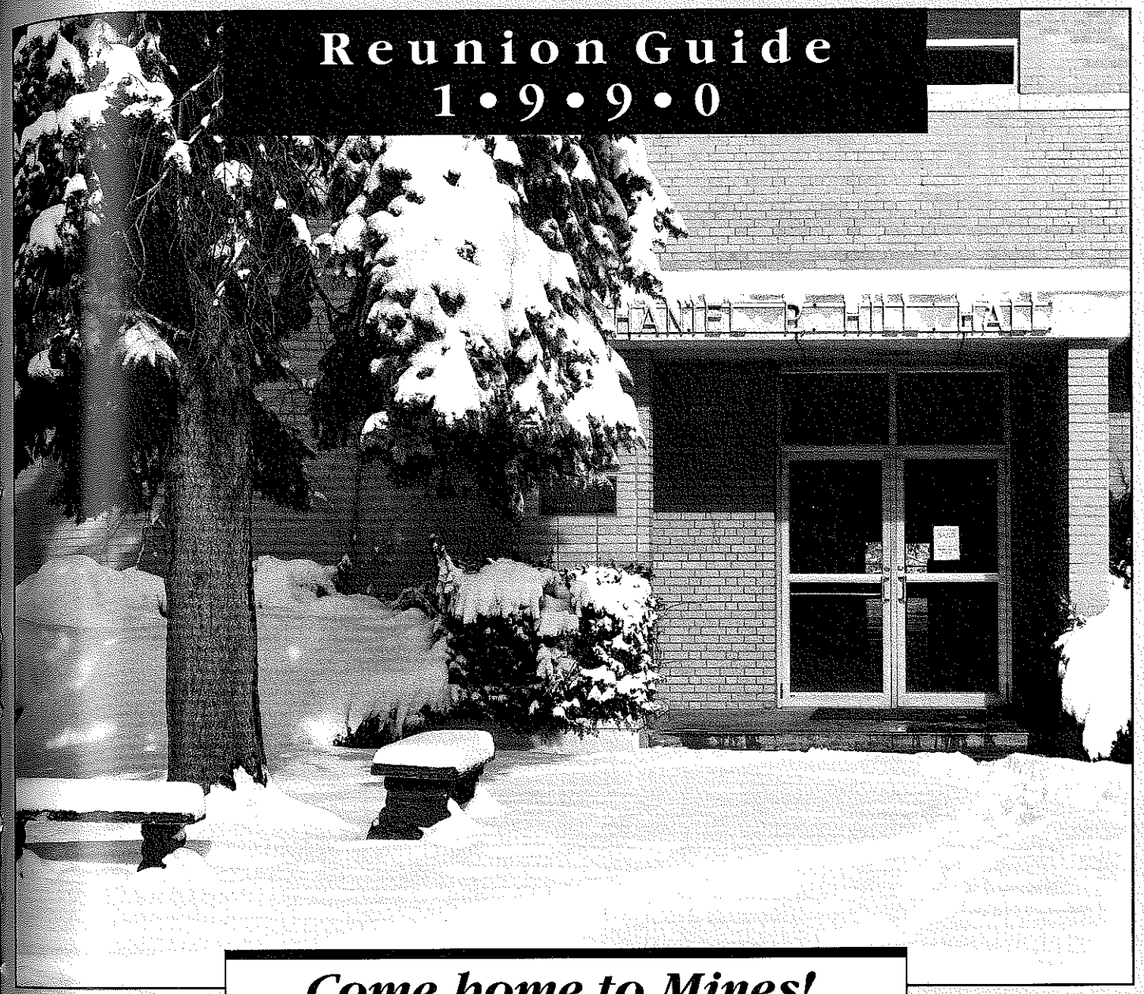


Photo by Rex Bull

Come home to Mines!

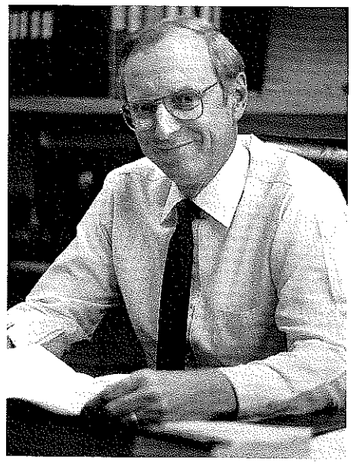
Welcome back to the Mines campus!

We have a lot planned for reunion and commencement weekend May 9–12, and we're extending a special welcome to the classes of 1930, 1935, 1940, 1945, 1950, 1955, 1960, 1965, 1970, 1975 and 1980.

Great things to do!

- Tours of campus
- Commencement ceremony
- Class reunion golf outing
- Reunion dinners and all alumni banquet
- Special guided tour of CSM's Experimental Mine in Idaho Springs
- VIP tour of Coors Brewery
- A climb to the "M"

We're anxious to make your visit memorable, so call us for reservations on our toll free number: in Colorado, (800) 245-1060; and out of state, (800) 446-9488.



Spring Commencement— Join us in May

by Norman Zehr, '52
Executive Director

We are approaching the busiest, and most enjoyable, part of the year— spring commencement.

The reason we are all here is to see young men and women finish the requirements for a degree from Colorado School of Mines, and be awarded those degrees. In that way they become alumni/alumnae of this great institution. They are then entered into the records maintained by the Alumni Association and become a part of the alumni activities of the school.

Until two years ago it was the custom for alumni who had been out of school for 10, 15 and 20 years to hold their reunion activities at Homecoming in the fall. It was decided that these reunion classes should hold their activities at the same time the other classes held theirs, i.e. at commencement in the Spring. This way they have more opportunity to mingle with the older classes and, no doubt, gain a great deal from this association.

We have not held reunion activities for classes five years after graduation as it was not felt there was much interest in such events. If there is the Alumni Association will be pleased to assist in arranging them.

Usually reunion activities include attendance at commencement, class reunion dinners, lunches, etc. and attendance at the all-alumni banquet. Other events, such as Coors tours and visits to departments of the school, are also included.

This year the student/parents/alumni banquet will be held on Thursday, May 10th in the Green Center. All alumni are welcome to attend, but the main purpose of this event is to allow the graduating students and their parents an opportunity to celebrate on the campus the evening before commencement. The program is carried out by the students and usually consists of awards they select for their fellow students and some faculty members. Many of the awards are humorous and the evening is light-hearted and enjoyable. We ask alumni to sponsor one or more students for the evening. It is not necessary for the alumnus to be present to sponsor the cost of a student(s) dinner. Those who are not sponsored by an alumnus are sponsored by the Alumni Association.

At the Friday night class dinners, the class agents and their committees prepare a program for the enjoyment of their classmates. These programs vary all over the map, depending on the wishes of those attending and the committee. It is important for those who plan to attend to make their wishes known to the committee. The Alumni Association assists in these arrangements but costs are borne by those attending.

The all-alumni banquet on Saturday night is just that - a dinner for all alumni who are able to attend. We have some entertainment, the reunion classes are honored, and a few awards are made by the association to outstanding alumni for their service to the association. Special attention is given to the 50-year reunion class which is also honored by the school at commencement. A new group, called the "Golden Miners" has been established for those alumni celebrating more than 50 years since their graduation. They are seated as a group, as are the reunion classes.

At various times during this weekend it has become the custom for reunion classes to present a class gift to the school. Each alumnus is encouraged to contribute what he or she can to the fund.

In no way, however, does this mean that those who can not, or do not wish to, contribute are excluded from the events. All alumni, whether members of the association or not, and whether they contribute or not, are most welcome at these events. Those who have not contributed will in no way be embarrassed. The important thing is to attend and spend some time with your classmates. That is the primary thrust of the entire weekend!

Some of the classes have registered very high participation rates in the past, and we want your class to beat those records. That is an integral part of the life of a Miner - doing better than those who preceded you. Only you can make that happen.

Please do your best to join us in May. We want to see all of you! Remember that families are especially welcome, and that includes widows and other family of graduates who can not be with us.

See you in May!

SCHEDULE OF EVENTS

1990 COMMENCEMENT AND CLASS REUNIONS
May 9–12, 1990

A SPECIAL WELCOME TO THE CLASSES OF:
1930, 1935, 1940, 1945, 1950, 1955, 1960, 1965, 1970, 1975, 1980

WEDNESDAY, MAY 9

3:00 p.m.	Class Reunion Registration until 9 p.m. in CSMAA Hospitality Room	Marriott West Hotel Room 623

THURSDAY, MAY 10

11:00 a.m.	Class Reunion Registration until 5 p.m. in CSMAA Hospitality Room	Marriott West Hotel Room 623
11:30 a.m.	Guided campus tour with w/Vice President Emeritus Dr. William M. Mueller '40 and Dr. David F. Coolbaugh '43; meet on front steps of Guggenheim Hall	15th & Illinois
1:00 p.m.	A climb to the newly-renovated "M"; relive a Mines tradition; coordinated by Blue Key President Bob Todd; meet at Intramural parking lot, Elm and 16th; reservations encouraged; call (303) 273-3295	16th & Elm
1:30 p.m.	CSM Board of Trustees meeting; open to public	Guggenheim Hall
2:00 p.m. AND 3:00 p.m.	National Earthquake Information Center Tour by Chief of the Center Waverly Person; two tours, each limited to first 25 guests; meet in exhibit area	USGS Offices 17th & Illinois
2:00 p.m. to 3:00 p.m.	Chemistry/Geochemistry Department Tour of research labs and overview of research activities w/Department Head Steve Daniel	Coolbaugh Hall Room 207
2:00 p.m.	Open house of newly-renovated Steinhauer Field House until 4 p.m; visit with coaching staff	Steinhauer Field House
2:00 p.m. to 4:00 p.m.	Humanities Dept/Media Center open house w/Prof. Donald Dickinson; tour of recently renovated Stratton Hall; light refreshments	Stratton Hall Room 313
4:00 p.m. to 5:30 p.m.	Petroleum Engineering Department reception for Graduating Seniors & Parents; Alumni invited; RSVP Dee, (303) 273-3740; Dept. open house all afternoon in Alderson Hall before reception room 209; everyone welcome	Ben Parker Student Center/ Wiley Room
6:00 p.m.	Seniors/Parents/Faculty/Alumni Banquet social hour 6:00 p.m.; dinner 7:00 p.m. program by the Senior Class; everyone welcome; reservations required	Green Center

FRIDAY, MAY 11

8:00 a.m.	Commissioning Ceremony Green Center Military Science Building open house 9-4 p.m. Thursday and Friday w/LTC Bruce P. Goetz	in Friedhoff Hall
9:00 a.m.	Commencement Ceremony*	Meyer Common
9:00 a.m. to 4:00 p.m.	Behind the Scenes of the CSM Computing Center; continuous demonstrations; tours from 1-3 p.m.; tour reservations suggested; RSVP Marge, (303) 273-3430; everyone welcome	Green Center Room 209
9:00 a.m. to 4:00 p.m.	Behind the Scenes of the CSM Geology Museum; Open house and informal tours w/Ginny Mast, curator; light refreshments	Berthoud Hall Maple Street Entrance
10:00 a.m.	Class Reunion Golf Outing Tee times to be assigned for each reunion class; $14/18 holes; $8/carts; pay at course; spouses welcome	Applewood Golf Course
11:00 a.m.	Class Reunion Registration until 4 p.m. in CSMAA Hospitality Room	Marriott West Hotel Room 623
11:30 a.m.	Get Acquainted and Reacquainted Brunch for all women; Coordinator Thelma Meltzer, Dames Club President '50; (713) 771-3314	Location/price to be announced at registration
1:00 p.m. AND 2:00 p.m.	National Earthquake Information Center Tour by Chief of the Center Waverly Person; two tours, each limited to first 25 guests; meet in exhibit area	USGS Offices 17th & Illinois
1:30 p.m.	CSMAA Board of Directors Meeting Open to the public	Board Room Guggenheim Hall
2:00 p.m. to 3:00 p.m.	Metallurgical and Materials Engineering Dept Brief overview followed by tour w/Department Head Dr. John Moore	Hill Hall Room 237
2:00 p.m. to 3:00 p.m.	Physics Department Overview of recent research developments w/Department Head Dr. John Trefny	Meyer Hall Room 302
2:00 p.m.	Open House of newly-renovated Steinhauer Field House until 4 p.m.; visit with coaching staff	Steinhauer Field House
2:00 p.m.	Informal guided tours of the Arthur Lakes Library until 4 p.m.; light refreshments	Arthur Lakes Library
2:00 p.m. to 4:00 p.m.	Geology and Geological Engineering Department: Overview of department initiative and participation in new IBM Exploration Sciences program with tour of new laboratory facilities conducted by Dr. Sam Adams and staff	Berthoud Hall Room 108
3:00 p.m.	Mining Department Tour w/Department Head Dr. Miklos Salamon	Brown Hall Room 239
5:00 p.m.	Class Reunion Registration/ MAIN LOBBY	Marriott West Hotel
6:00 p.m.	Class Reunion Social Hour and Dinners; Class pictures taken	Marriott West Hotel

SATURDAY, MAY 12

8:00 a.m.	Sigma Phi Epsilon Alumni Breakfast/ RSVP Dave List 303/988-3786; Bob Reeder 303/279-4445	1801 W. Campus Rd, No Charge
9:00 a.m. throughout the day	Tour of the CSM Experimental Mine offered every hour by Bruce Carlson, mine manager; last tour 3:00 p.m.; limited to first 20 guests each hour; free to alumni and their guests; wear light jacket/flat shoes/slacks; museum on site; reservations may be made by calling (303) 273-3290	Idaho Springs 8th Street
10:00 a.m. to 10:30 a.m.	Demonstration of Robotics and Artificial Intelligence Technology w/Dr. Chidambar Ganesh, Assistant Prof. of Engineering	Brown Hall Room 154
11:00 a.m.	CSMAA Hospitality Room 623 Open from 11:00 a.m.-3:00 p.m.	Marriott West Hotel Room 623
1:00 p.m.	Coors Dutch Lunch followed by Brewery Tour; Tickets available in Marriott Hospitality Room 623 to *FIRST 200 REQUESTS*; park in Coors visitors' parking lot, 13th and Ford; then take their shuttle	Coors
6:00 p.m.	All Alumni Banquet - Everyone welcome social hour 6:00 p.m.; dinner 7:00 p.m. reservations required.	Green Center

**Commencement will be held outdoors on MEYER COMMON, weather permitting. If inclement weather, the ceremony will be held indoors with a limited number of tickets available for other than seniors and their parents.*

Any alumnus who has reached the age of 72 but has not celebrated a 50th reunion is invited to join us at the All Alumni Banquet on Saturday and be recognized as a ***Golden Miner****. Please contact the alumni office for details.*

1990 COMMENCEMENT AND CLASS REUNIONS
MAY 9~12, 1990

RESERVATIONS

Name _____ Class Year _____
(Please print first and last name as you would like it to appear on name tag.)

Address _____

City _____ State _____ Zip _____ Daytime Phone _____

I will be accompanied by _____
(Please print first and last name as it should appear on the name tag.)

Our host hotel is the Marriott Denver West in Golden. A large block of rooms, single and double, has been reserved for reunion week at a rate of $65.00 per night if reservations are made by April 18, subject to availability. If interested, call 1-800/228-9290 and tell the reservations clerk you want the CSM reunion rate.

PLEASE MAKE MY RESERVATIONS FOR THE FOLLOWING:	**No. of Reservations**	**Amount**
THURSDAY, MAY 10		
Banquet for Graduating Seniors*	_____ @ $15. 00 each	= $ _____
*It has been a tradition that graduating seniors are sponsored at the banquet by individual alumni. Please indicate the number of seniors you wish to sponsor.		
I will sponsor senior(s).	_____ @ $15. 00 each	= $ _____
FRIDAY, MAY 11		
Number of tee times needed for golf outing	_____	
SATURDAY, MAY 12		
All Alumni Banquet		
Filet Mignon	_____ @ $18. 00 each	= $
Chicken Kiev	_____ @ $15. 00 each	= $
	TOTAL AMOUNT DUE	$ _____

Your cancelled check will confirm your reservations.
Reservations made after April 30 will be accepted only on a space-available basis.

PLEASE MAKE CHECK PAYABLE TO CSMAA AND MAIL TO:
CSMAA, P. 0. Box 1410, Golden, CO 80402
For additional information call: (303) 273-3295 or (303)273-3290
Outside Colorado call 1-800/446-9488, ext. 3295 or 3290

NEWS FROM THE GEOLOGY MUSEUM

by Ginny Mast, Curator

"CJ's Crystal Palace" is a small, fault-controlled cave in Precambrian gneiss. What makes it unusual, perhaps unique, are its abundant calcite and aragonite decorations that are like those normally found in limestone caves.

The cave was found during routine blasting in a gravel quarry about a mile west of the first tunnel in Clear Creek Canyon. First opened on May 12, 1988, it was sealed again on May 17, 1988, with its fate unknown. By mid-May, 1990, CJ's will be open to visitors in the CSM Geology Museum, thanks to the efforts and support of a variety of interested groups and individuals.

Rick Batista, a Jefferson County Road and Bridge Department blaster, located and opened the cave, and named it for his wife. He and the Road and Bridge Department supervisors, the Jefferson County Commissioners and County Planners have provided vital expertise and equipment throughout the documentation and recovery process.

Although the quarry was a Jefferson County operation, it is located on private land. The landowner, O.R. Goltra (Goltra Castings, Golden, Colorado) and his attorney, Thomas R. Young, M.E. '52, mandated the preservation of the cave, which otherwise would have succumbed to the quarry operation shortly after it was found.

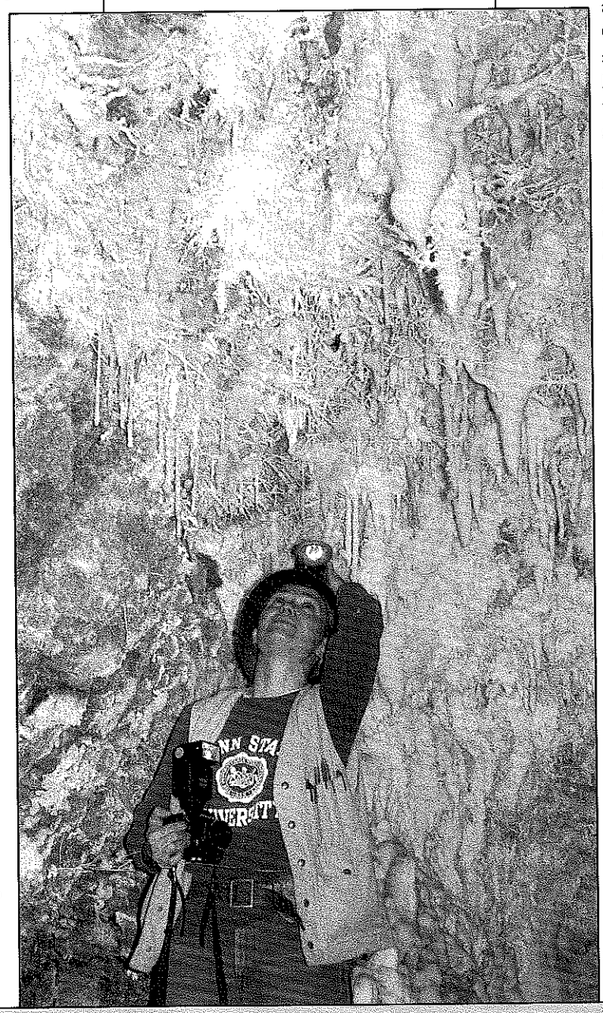
Mr. Goltra subsequently gave the contents of the cave to the CSM Geology Museum with the charge that the materials be used for research and display, thus preserving the cave and making it accessible to the general public. Since CJ's sits in the path of a proposed road cut, and will eventually disappear, we agreed to document the cave and preserve it by moving it.

Obviously, moving a whole cave—even a small one—is a daunting task. We chose instead to mine out as many of the decorations as we could while documenting the rest of the cave through mapping and photography. With the guidance of Dr. Miklos Salamon, head of the CSM Mining Department, and under Bruce Carlson's direction, we returned to the cave in June 1989 to carry out those tasks during an intense week of work. Bruce, who is the Experimental Mine manager, and three students (Johnny Blizzard, Lisa Oliver and Scott Burke) did the lion's share of the labor, and we recovered 500 or more specimens.

The cave minerals have now been catalogued and are ready for either research or placement in the Clear Creek Cave exhibit, a multimedia presentation centered on a reconstruction of portions of CJ's Crystal Palace.

Besides Jefferson County, the CSM Mining Department, Mr. Goltra and Mr. Young, there are other important contributors to the project: Peter Modreski, Karen Wenrich, Earl Verbeek, Jack Reed, Bran Van Gosen and Hoyt Sutphin of the U.S. Geological Survey (USGS) have done extensive and significant scientific and photographic work in the cave. C. Walden from the Bureau of Reclamation did stereo photography in the cave. The Mine Safety and Health Administration supported our efforts, and Dan Kyle of USGS and his wife, Di-

continued on next page

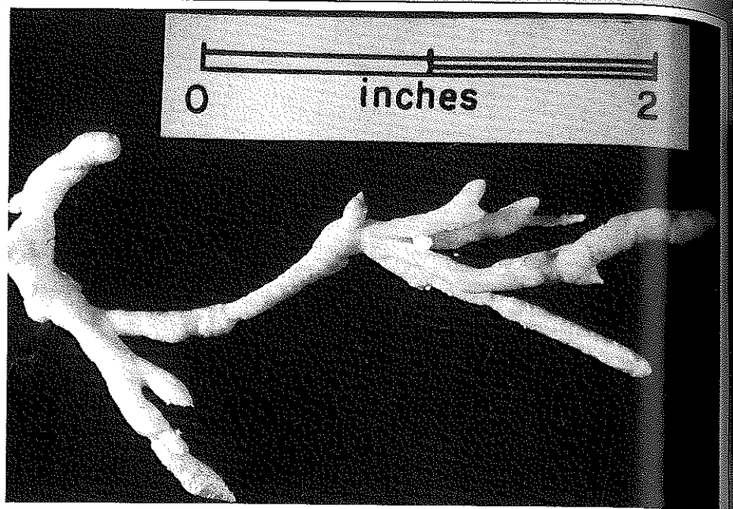


Karen Wenrich of the USGS looking up at formations on the main ceiling. (Denver Museum of Natural History photo)

anne, provided their expert mineral collecting skills and tools, while Lee Pruitt spent hours documenting everything on video tape. The expertise, time and equipment donated by these people are of incalculable value—and museums survive and thrive on such support!

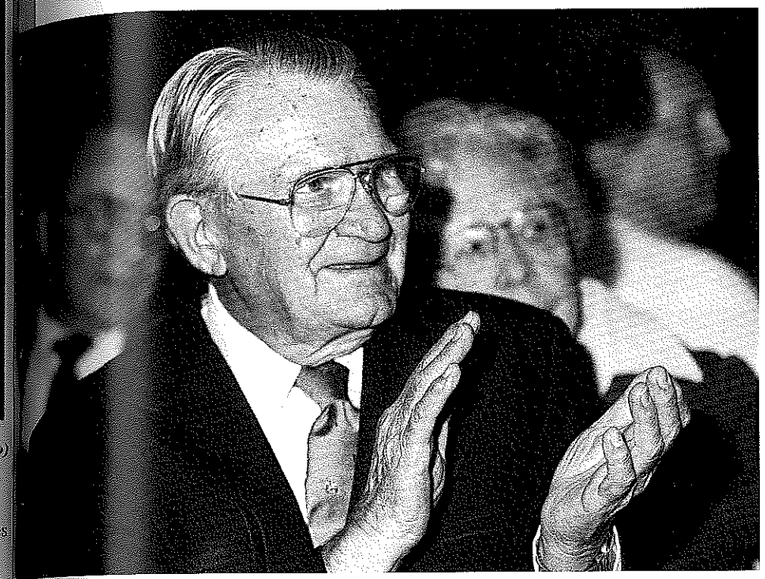
A boost to the planning phase of the exhibit was provided last spring by two groups of second-year EPICS students who chose to research and design the exhibit. They also came up with cost figures that allowed us to set fundraising goals for the project.

Lastly, with the help of the CSM Office of Institutional Advancement, we set out to raise $20,000 to build the exhibits. The Greater Denver Area Gem and Mineral Council, the Golden Civic Foundation, and O.R. Goltra have each given $5,000 to the project. With their generous donations we've been able to start construction. Although we still need $5,000 to assure successful completion of the exhibits, I invite all of you who are on campus for commencement and reunions in May to stop by and see the Clear Creek Cave Exhibit.



A sample of the kind of crystal found in the Clear Creek cave. *(Peter Modreski photo)*

Come Home to Mines!



Ted Benson

Outstanding Alumnus Award

The Colorado School of Mines Alumni Association is proud to announce that Einar "Ted" Benson, E.M. '33, has been nominated as the outstanding alumnus for 1990. Benson will be presented with a plaque at the All Alumni Banquet May 12, 1990 and everyone is invited to celebrate with Ted and his friends.

Though he did not graduate until 1933, Ted has shown his support for CSMAA since 1931 when he applied, as a student, for a junior membership in the association, paying the dollar a year dues required at the time. He has been a very loyal and active alumnus ever since, becoming a life member in 1983.

In the early 1970s while with General Motors Overseas Operation in New York, Ted acted as secretary-treasurer of the New York Mines alumni section.

When he moved back to Denver after retiring from General Motors, he continued attending alumni functions, including homecoming activities, Quarterback Club, and section meetings, often accompanied by his wife, Mary.

Ted also helps to raise funds from his class members for the Melville F. Coolbaugh Class of 1933 Memorial Award that is presented each spring at the All Alumni Banquet. One award is presented to an alumnus, and one, in the form of a $2,000 scholarship, to a deserving Mines student.

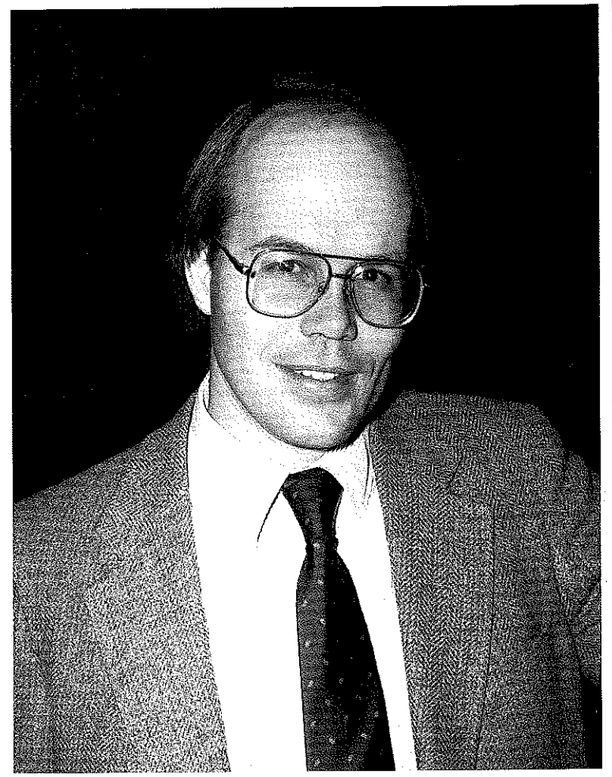
The award is for meritorious service on behalf of the Alumni Association and consists of an honorary membership and an engraved plaque.

Young Alumnus Award

Chris A. Oglesby, BSc. '80; MSc. '88, the 1990 Young Alumnus of the Year, has been the section co-coordinator of the largest Mines alumni group, the downtown Denver section. Together with Dr. Steve Sonnenberg, Ph.D. '81, the two have hosted breakfast meetings with guest speakers including a number of alumni.

He supports other alumni functions, and is chairing the 1980 class gift committee this year as they celebrate their tenth reunion.

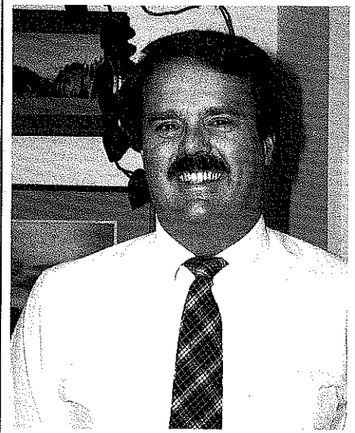
The Young Alumnus Award recognizes the contributions to the school and the Alumni Association of younger alumni. Someone must be under 40 years old, and received his or her first degree within the last 15 years.



Chris Oglesby

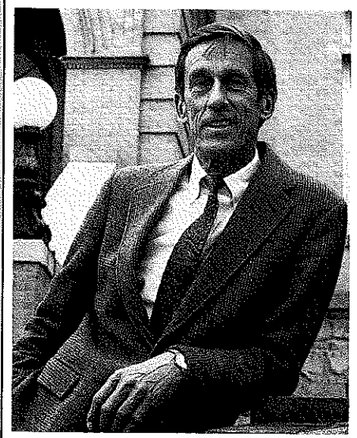
Honorary Membership

Six people have been accorded honorary membership in the Mines Alumni Association for their contributions to Mines. The honoraries are: James K. Applegate, Dr. Ramon "Ray" Bisque, David F. Coolbaugh, Marshall C. Crouch, III, Michael S. Nyikos, and Dr. Craig W. Van Kirk.



James Applegate

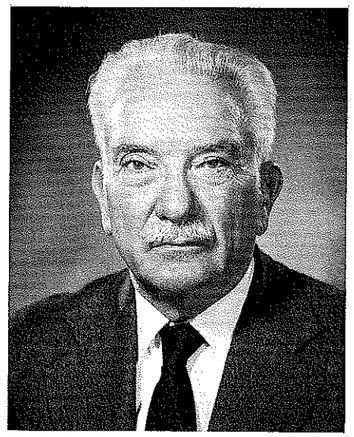
James K. Applegate received three degrees from Mines (Geop. E. '66; MSc. Geop. '69; PhD. '74), and served the association as secretary, treasurer, and president. He also served as the



Ray Bisque

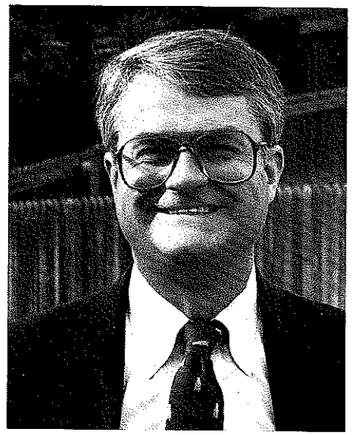
alumni representative on the CSM Foundation Board of Directors for two years. For his past and continuing dedication to the association, Applegate will receive this honor.

Dr. Ramon "Ray" Bisque has been on the Mines faculty in the Chemistry Department since 1959. He served as department head for several years, and at times he served as an adjunct professor while he managed his company,



David Coolbaugh

Earth Sciences. He has consistently hired Mines graduates in his business and provided summer work for undergraduates. Two of his sons have graduated from Mines. He has promoted



Marshall Crouch

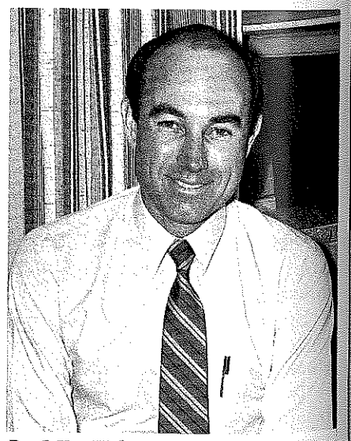
Mines enthusiastically in his extensive travels.

Dr. David F. Coolbaugh (Geol. E. '43; E.M. '47; DSc. Geop. '61) has been a true supporter of Mines. During his many years of foreign service in Mexico, Korea and South America he maintained membership in the association, and was responsible for hiring numerous Mines graduates on his projects. Since his return to Colorado several

Dr. Michael Nyikos

years ago he has been active as chairman of the centennial committee for the association, as a guide on reunion campus tours and other functions.

Coolbaugh's father was president of



Dr. C. Van Kirk

Mines, and four members of his family are Mines graduates.

Continued on page 44

SECTIONS

DENVER WEST

The Denver West Section met at the Sheraton Hotel, January 18, to hear Professor Bill Astle, a member of the CSM Faculty Senate, address some of the issues and concerns between faculty and administration. Joe Cornellisson (BSc. Geol. 1979) coordinated the meeting.

Also in attendance were Don Adams '52; Tim Albers '83; Jim Applegate '66; Brenda Bain '83; Dick Beach '66; Marshall Crouch '67; Dick Daniele '60; Trevor Ellis '78; Al Geyer '64; Robert N. Johnson '57; Jim Johnstone '48; Sasha Karpow '80; Alan Mencin '79; George Mitchell '53; Bill Mueller '40; Chris Oglesby '80; Art Pansze '63; Mary Pott '83; Steve Schwochow '70; Tom Smagala '74; John White '66; and Dan Witkowsky '66. Laura Robinson, Mary Jo Giddings, and Norm Zehr from the Alumni Association were present as was Jenifer White and Dave Powers from the Office of Institutional Advancement.

The next Denver West section meeting will be in April at the Sheraton Hotel in Lakewood. For additional information call Joe Cornellisson at 303/236-5202.

HOUSTON

Nineteen alumni met for lunch in February according to section coordinator Chuck Russell (P.R.E. 1954). Guests included Wally Arnold '53; David Cone '65; Bruce Craig '70; Tye De Mass '83; Art Dickinson '50; Mark Fitzgerald '75; Bob Gindrat '78; Irwin Glasser '43; Bob Hartmann '58; Rich Hurt '72; Murray C. McKimmon '52; Gary Miller '69; Herb Poitz '41; Steve Rasey '78; Bill Smith '59; Tom Stone '75; and Jack Weyler '50.

The Houston section meets monthly. For additional information call 713/726-9477.

OKLAHOMA CITY

According to Greg Staff '73, director, Central region, "The Oklahoma City chapter of the Colorado School of Mines Alumni Association met at the Fifth Season Inn on February 20. In attendance were Dick Oppel '51, John Bedwell '74, Chuck Dunn '49, Ed Johnson '49, Alan Roberts '63, John Lee '73, Stan Dobler '64, Steve McGoffin '74, and Tom Huzzey '73."

"It was decided that we would try to have regular quarterly breakfast meetings on the 2nd Tuesday of the first month of each quarter. The first such breakfast is scheduled for 7:00 a.m. on April 10 at the Fifth Season Inn, followed by breakfasts at the same time and place on July 10 and October 9. We will attempt to notify everyone by telephone prior to the meetings, but please mark your calendar in the event that you miss our call. (The Fifth Season Inn is at the southwest corner of the intersection of NE 63rd and the Broadway Extension.)"

PHOENIX

Dick Richards (Geol. E. 1962), our "Phoenix connection", writes that 15 alumni and guests attended a luncheon for Dr. and Mrs. Ansell on January 3. Visiting with the Ansells were Ronald W. Clifton '63; Bob Comstock '41; David Conrad '79; Donald Haines '78; Matt Horton '87; Don Kammerzell '71; Michele Kogl '86; Roland Kyllmann '89; Alfred A. Lee '50; Kenneth H. Matheson, Jr. '48; Hugh E. Templeton '36; and M.J. Williams '33. Mark Monty, CSM executive director of development, was also at the meeting. This was the first section meeting for the Phoenix alumni, but Dick says that due to the positive response, plans were made for another section meeting in February. For additional information, call Dick at 602/437-3737 (work) or 602/496-0817 (home).

If you have news to share about your section or would like to help us organize an alumni section in your area, please write or call Norm Zehr or me; inside Colorado 1-800/245-1060 ext. 3296 or 3290; outside Colorado 1-800/446-9488, ext. 3296 or 3290.

Mary Jo Giddings
Associate Director, Alumni Services

CSM FOUNDATION TO RECEIVE $4 MILLION WEAVER BEQUEST

The Colorado School of Mines Foundation will receive a bequest valued at approximately $4 million, thanks to the generosity of the late Phyllis and Gaylord C. "Buck" Weaver. The Weaver bequest, in the form of a trust, represents the largest single addition to the endowment in the history of CSM.

Weaver, a Denver native and a 1926 graduate of CSM, died in 1987. His wife, Phyllis, had received income from the trust throughout her lifetime. Upon her death on January 14, 1990, the trust's assets were assigned to the foundation.

According to CSM President Dr. George S. Ansell, full details of the estate's value are not yet available, because several assets have yet to be appraised. Attorneys estimate that the total bequest to the foundation will be in the $4 million range.

"We are saddened to learn of the death of Phyllis Weaver," said Ansell. "Buck and Phyllis were longtime friends and supporters of Mines."

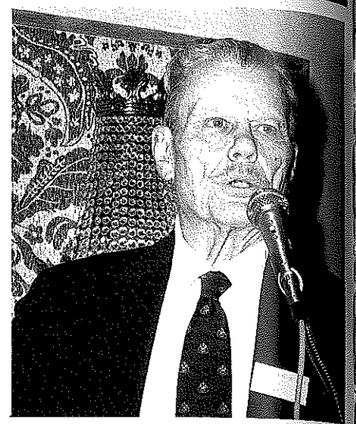
"Buck felt his Mines education had given him the skills and independence responsible for a lifetime of success," continued Ansell. "His love for Mines was so great that he arranged for virtually his entire estate to come to the school, after providing for the needs of his wife."

"This gift is especially meaningful since we are preparing for a major fund-raising campaign in support of the school," said Russ Wood, member of the CSM Board of Trustees and chairman of the Trustee Development Committee. "The Weaver gift will help assure a strong start for the nucleus fund of the campaign, since the bulk of the gift will go to the endowment fund, helping us to build a strong foundation for the future."

Weaver was born in Denver in 1902. After graduating from CSM, he worked for several large mining companies in the United States and South America. He moved to Carlsbad, New Mexico, in 1935, where he worked with the Potash Company of America. He later became a well-known independent consultant. Weaver is credited with the discovery of a major potash deposit near Carlsbad, as well as substantial copper reserves in Arizona. He was named a Mines Medalist in 1967 for his outstanding career achievements.

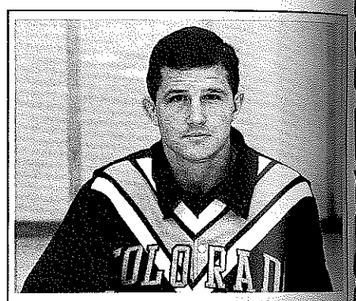
This most recent bequest is the second gift Weaver has made to the foundation. In 1977, he created a trust which is now valued at $438,000.

The Colorado School of Mines Foundation is an independent, nonprofit corporation chartered to receive and manage funds for the benefit of the School of Mines.



Changing of the Guard

At the February annual meeting CSMAA President Dr. Bill Mueller handed over the reins to president-elect James Johnstone. (E. Glover photo)



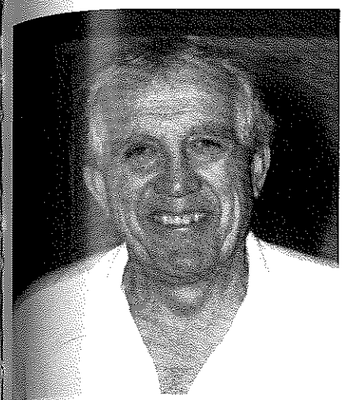
Glen Frank, a sophomore wrestling for Mines at 134 pounds, enrolled at Mines in January 1989 following five years in the service where he wrestled on the All-Marine team. He placed sixth in the NCAA II Championships last year, and at the present time, Glen has won the Wyoming open, the Oklahoma open, an eight-team Wyoming invitational, an 11-team Chadron State, Nebraska tournament, and the prestigious Colorado Collegiate tournament.

He was voted "Outstanding Wrestler" at the Wyoming invitational and the Chadron invitational. Currently Glen is 35-6 with one dual meet left and the NCAA II qualifying meet in San Francisco, California, and then with some luck, the national tournament in Wisconsin later this month.

He is captain of the Mines team and carries a 3.6 GPA.

CSMAA officers for the coming year are (left to right): Gary Hutchinson '62, secretary; J. Paul Mathias '62, president-elect; Vicki J. Cowart '77, treasurer; and James Johnstone, president. (E. Glover photo)

COACH OF THE YEAR

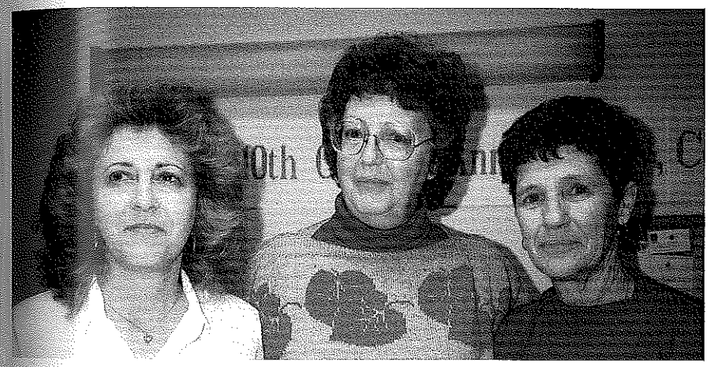


Jack Hancock was voted the 1989-90 Colorado Wrestling Coach of the Year at the annual Colorado Collegiate Wrestling Tournament on February 3rd. Hancock was selected by college wrestling coaches from around the state to be the first recipient of the new award.

"It gave me a lot of satisfaction to be picked by my fellow coaches," he said.

Hancock has been at CSM since 1955 and coached in a variety of sports. He is also the tennis coach.

Staffers celebrate 10 years with CSMAA



(Photo by M.J. Giddings)

Three staff members celebrated their tenth anniversary with the Alumni Association this past year: (left to right) Judy Arbuckle, association secretary, and Corlee Rutherford and Betty Myers in the records department.

The women started with the association in 1979. At that time, the organization was housed in Guggenheim Hall with George W. Mitchell, Jr. '53 as the executive director. Since then they have worked with Executive Directors Col. William E. Leckie '49 (interim director), David M. Crawford '51, Dr. William M. Mueller '40 (interim director), and, currently, Norman R. Zehr '52.

As the Alumni Association has moved from Guggenheim Hall to Chauvenet Hall to Twin Towers, Betty and Corlee have continued to update the alumni records, watching the number of graduates grow from 10,763 in 1979 to 16,061 in 1989. During that time they have experienced the growing pains and the triumph of working through three computer systems conversions.

Judy has a wide area of expertise in alumni relations having previously assisted with placement, records and *Mines Magazine*. As the association's secretary and assistant bookkeeper, she also works closely with the student loan program and class reunions. Judy coordinates the hundreds of reservations for special events that are made through our office each year.

CSMAA wishes to congratulate and thank Judy, Betty and Corlee for their ten years of dedicated service.

April 19

DENVER WEST ALUMNI - BREAKFAST, 6:45 a.m.; Sheraton Hotel, 360 Union Boulevard, Lakewood; $8. For reservations call Joe Cornellisson (BSc. Geol. '79) 303/236-5202.

May 10-12

COMMENCEMENT/SPRING REUNION WEEKEND - A special invitation to the classes of 1980, 1975, 1970, 1965, 1960, 1955, 1950, 1945, 1940, 1935 and 1930; many events scheduled including Reunion Class Dinners May 11 and All Alumni Banquet May 12

May 31

CSMAA SIXTH ANNUAL GOLF TOURNAMENT, Applewood Golf Course, Golden. Reserve the date! Ed Warren (Geol. E. 1950) chairman; Art Meyer (Geol. E. 1950) co-chairman; 7:00 a.m. shotgun start; $65.

June 14-16

REUNION/CONFERENCE - "THE MATERIALS INDUSTRIES IN THE TWENTY-FIRST CENTURY" - Held on campus by CSM Department of Metallurgical and Materials Engineering to commemorate the 100th anniversary of granting the first Met. degree. Alumni with Met. degree, former and current faculty, & friends are invited. Call 303/273-3770 or write department for further details.

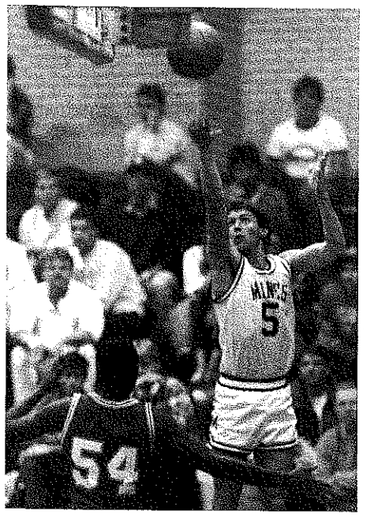
June 19

DOWNTOWN DENVER ALUMNI - BREAKFAST MEETING, Holiday Inn Downtown 7:00 a.m.; For reservations call Chris Oglesby (BSc. Geol. '80) or Steve Sonnenberg (PhD. Geol. '81) at (303) 292-1314.

Sept. 18

DOWNTOWN DENVER ALUMNI - BREAKFAST MEETING, Holiday Inn Downtown 7:00 a.m.; For reservations call Chris Oglesby (BSc. Geol. '80) or Steve Sonnenberg (PhD. Geol. '81) at (303) 292-1314.

Men's Basketball team concludes season with 15-15 record



Mike Ziegler leaps for one more basket in his quest for a career and school scoring record.

The CSM men's basketball team came close to playing in national competition in March, but Grand Canyon University of Phoenix, Arizona crushed their hopes with a 99-76 defeat. Mines' overall record was 15 wins and 15 losses with some good games against some regional teams.

The Orediggers defeated Adams State College 69-63 in Golden before playing Grand Canyon by building a seven point lead at half-time, 32-25, and held on in the second half to win a first round NAIA District 7 playoff game. Mines played excellent defense in allowing only one Adams State player to score in double figures. Meanwhile, four Miners scored in double figures, led by Mike Ziegler and Hank Prey with 18 points apiece.

Mines went on to play in the second round playoffs with New Mexico Highlands University with a victory of 104-92. If they had defeated Grand Canyon they would have advanced to national finals in Kansas City.

Ziegler, a senior from Laurens, Iowa, set a school record by finishing with 2,414 points.

CSM Materials Science Program Aims for Growth, Graduate Students

William Copeland, professor of metallurgical engineering, has been named coordinator of the Materials Science Program at Colorado School of Mines.

"As one of the principal designers of the original materials science program and one who has played a leadership role in it since its founding, he is an ideal choice for this position," said CSM Vice President for Academic Affairs Frank Schowengerdt.

According to Copeland, program growth and student recruitment are top priorities for the program.

"We're going to make the program bigger and better," he said, adding that recruitment efforts are being stepped up in order to attract more high-quality graduate students.

The Materials Science Program brings together five departments — chemistry, chemical engineering, engineering, metallurgical and materials engineering and physics — to offer graduate level coursework. Students enrolled in the program can earn either a master's degree or a doctorate.

The multi-disciplinary nature of the program exposes students to a wide variety of materials and technologies.

Copeland recently served as head of the metallurgical and materials engineering department, chaired the tutorial committee of the McBride Honors Program and was dean of graduate studies and research.

FORE! O..O...O....O.....O.....O

It's time to get out your clubs, clean up your golf shoes, buy some new golf balls and join us for the CSMAA Sixth Annual Golf Tournament.

Mark your calendar for Thursday, May 31, 1990, to be at the Applewood Golf Club, 14001 West 32nd Avenue in Golden. The tournament, a team scramble with three flights, will begin with a 7:00 a.m. shotgun start and end with a noon barbecue.

The entry fee of $65 per person includes a $30 contribution to the CSMAA Emergency Student Loan Fund, plus a cart, greens fee, beverages, lunch and prizes. For CSM students there is a special entry fee of $35.

The tournament was initiated in 1985 by CSM alumni Ed Warren and Art Meyer, two avid golfers from the Class of 1950 who wanted to raise money for the CSMAA Student Financial Aid Program. More than $16,000 has been raised for the fund from the past five tournaments.

The Alumni Student Loan Fund is available to CSM upperclassmen who are unable to obtain financial assistance from other sources. Last year your Alumni Association, through the CSMAA Fund, was able to assist 71 students with loans totaling approximately $78,000.

The tournament is open to Miners and friends. Individuals may form their own team or be placed in a foursome by the golf committee. Handicaps are not necessary, but players will be asked to give their estimated average score if they do not have a handicap.

Working on this year's golf committee with chairman Ed Warren '50 and co-chairman Art Meyer '50 are Eldon Brickle '66, Ned Davis '52, Tim Hoops '79, Ken Nickerson '48, Paul Owen '71, Jeff Rhodes '82, Steve Sonnenberg '81, Barth Whitham '79, and student liaison, Blue Key President Bob Todd '90.

For additional information, or if you wish to help with this year's tournament, please call the Alumni Association office, 303/273-3290 or, outside Colorado, 1-800/446-9488, ext. 3290.

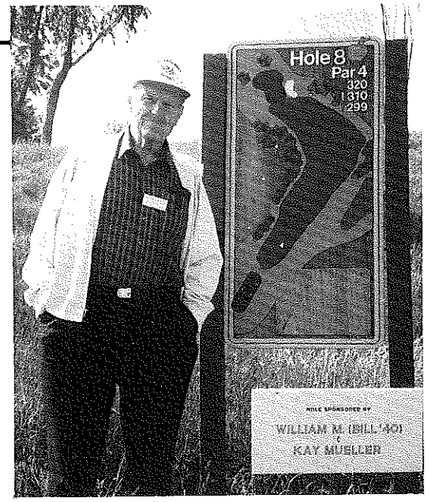
Bill Mueller '40, one of the eleven hole sponsors of the 1989 tournament. Would YOU or YOUR company like to sponsor a hole?

TO: Art Meyer '50
1989 Golf Chairman
FROM: Dick Van Horn '47
SUBJECT: A more equitable scoring system

Despite the abortive racist, sexist and "ageist" Klay Kreaker Koup attempt of last year to unseat me from the oldest and most decrepit golf foursome in all Christendom, I support his handicap approach to the annual CSMAA Golf Tournament (Mines Magazine, May '89, p. 32). We old FARTS (Fellows All Rallied to Swing) demand fairness in love, war and golf—which the CSMAA is not providing. Last year even the beer cart lost us and we didn't get to wet our whistles until 8:32 a.m.

This year (no fault of Kreakers) I won't be able to attend the tournament because of a prior commitment to the AMQUA-CANQUA Conference. I offered my spot in the foursome to my wife of 47 years (Golden High '38; Dames Club '47) but she refused on the grounds that discrimination in any form was not her bag. So, by the enclosed check, I offer my spot to any nondiscriminating Mines student who (1) has a handicap of 60 and is willing to play with the FARTS; or (2) has played golf before and will play in any foursome.

CSMAA 6TH ANNUAL
GOLF TOURNAMENT
Thursday, May 31, 1990
at the
Applewood Golf Club,
14001 West 32nd Ave.
Golden



(Photo by M.J. Giddings)

TO: Dick Van Horn '47
FROM: Ed Warren '50
1990 Golf Chairman

Art Meyer, golf chairman in 1989, deferred your cockamamie (his words) letter of January 23, 1990, to me for an answer. Clay Creager '41 founder of the Klay Kreaker Koup assured me that he cannot attend the golf tournament this year because of a previous commitment. His story sounded "fishy" to me but no amount of cajoling could sway him from this so-called commitment.

The CSMAA golf committee met February 15 and is beginning to question if two of the old FARTS may actually have become too decrepit to participate in golf in spite of some dubious excuses.

The golf committee will meet in both midnight sessions and at the course to discuss these ridiculous allegations concerning the scoring set up by this august and high-minded group of superlative Miners. We hope to have a decision to this weighty matter by late next summer.

P.S. We do, however, sincerely thank you for your contribution.

ALUMNI UPDATES

40s

'44 Donald W. Roe, Met. E. has retired as special counsel of Security Life of Denver.

'48 Richard M. Stewart, E.M. has retired as senior staff assistant with Westinghouse. **William R. Smith, P.E.** has retired after 31 years with the State of Colorado, 13 with the Water Resources Division and 18 with the Oil and Gas Conservation Commission (OGCC). He retired September 1, 1989 as director of the OGCC. Smith plans to do consulting work from his home in Littleton, Colorado.

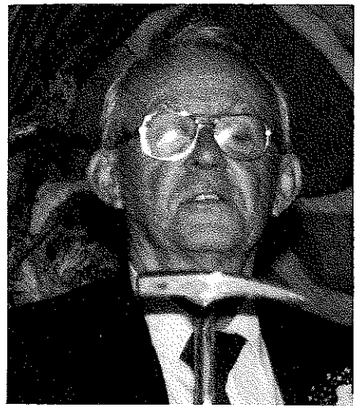
50s

Charles Melbye, '50

'50 Charles E. Melbye, Geol. E. was elected chairman of the board of the Colorado Mining Association on February 8, 1990, during the 93rd National Western Mining Conference & Exhibition in Denver. He is currently a director of United Mining Corporation, Reno, Nevada and a mining consultant to several other companies.

'51 Edmund R. Blakeman, Geop. E. has retired from Mobil Oil (formerly Superior Oil Co.) in Dallas, Texas. **John W. Miley, E.M.** has retired from the Bureau of Land Management and is now living in Montrose, Colorado.

'52 William F. Oline, Geol. E. has retired as vice president/exploration of Celsius Energy Company. He was employed by the corporation for 18 years. During his nine-year tenure as manager and vice president, the company



William Oline, '52

made significant oil and gas discoveries at the Cutthroat and Hiawatha Deep Fields in Colorado, the Bug Field in Utah, the Dripping Rock Field in Wyoming and the Bird Field in Nebraska. Bill and his wife, Marilyn, reside in Salt Lake City, Utah.

'54 Rachal H. Lewis, Jr., E.M. is vice president and general manager of Ivanhoe Gold Co. (a subsidiary of Galactic Resources) in Winnemucca, Nevada.

'56 Manuel A. Robles, E.M. is a teacher at Capistrano School in El Paso, Texas. **Charles E. Stott, Jr., E.M.** is president and ceo for Horizon Gold Shares, Inc. in Golden, Colorado.

'57 William D. Jackson, P.E. is a partner with Hubbard, Thurman, Turner, Tucker & Harris - patent and trademark attorneys in Dallas, Texas. **Donald R. Van Sandt, Geop. E.** is a staff engineer for Conoco, Inc. in Ponca City, Oklahoma.

'58 David L. Bowler, P.E. is manager/Anchorage division, exploration and production with Conoco, Inc. in Anchorage, Alaska. **Lawrence Ogden, DSc. Geol.** has retired as a professor in the geology department at Eastern Michigan University.

'59 Prasert Kulvanit, E.M. is a managing director for Thai Pioneer Enterprises Co., Ltd. in Bangkok, Thailand.

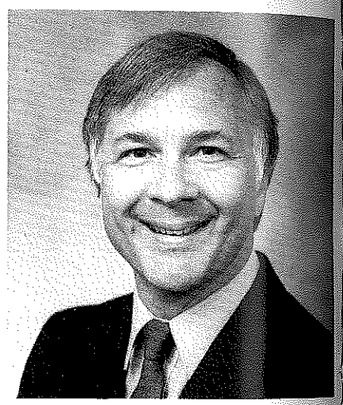
60s

'60 George A. Holcomb, E.M. is vice president/operations for North Lily Mining Co. in Tucson, Arizona.

'64 Thomas L. Hughes, E.M. is director/resource development with Amax Gold in Golden. **Albert P. Geyer, Geol. E.** has been promoted by Waddell & Reed financial services from registered representative to district manager/Lakewood (Colorado) division. **Ronald B. Mellor, P.E.** is senior petroleum engineer with Jerry R. Bergeson & Associates in Golden.

'65 Robert M. Woodbury, E.M. is general manager for San Rafael Rock Quarry in San Rafael, California.

'66 Robert L. Sandefur, Phy. E. and **MSc. Phy.'73,** associate geostatistician, has joined Pincock, Allen & Holt, Inc., an international natural resource consultancy in Lakewood, Colorado.



Albert Geyer, '64

Thomas F. Kellett, P.R.E. is president of Kellett Resources in Houston, Texas. **A. Thomas Peery, P.R.E.** is manager/chemical plans and development for Shell Oil Co. in Houston. **Arthur F. Helbig, E.M.** is project manager for Morrison-Knudsen Co., Inc. Mining Group in Boise, Idaho. **Dennis I. Rubin, Geol. E.** is an associate for Woodward-Clyde Consultants in New Jersey.

'67 John R. Hoyer, E.M. is vice president/operations for Warner Co. in Rosemont, Pennsylvania.

'68 Donald L. Bryson, Geop. E. is development manager for Maxus Exploration Co. in Amarillo, Texas. **Robert E. Guttridge, P.R.E.** is principal engineer for Fluor-Daniel in Irvine, California. **Jon M. White, Geol. E.** is with the U.S. Department of Energy/

vada operations in Las Vegas, vada. **James H. Cannell, Phy. E.** is diagnostics engineer for Altos Comter Systems in San Jose, California. **harles E. Brooks, Met. E.** is a quality surance manager for Vancouver Exsion Co. in Vancouver, Washington. **ymond K. Will, MSc. Min.** is a senor civil engineer for Todd Consulting gineers in Berkeley, California. **ichard D. Smith, Met. E.** is a project anager for Hazen Research, Inc. in lden.

69 James M. Riddle, E.M. and **Sc. Min. '75** is a member of the chnical staff for TRW, Inc. in Belleve, Nebraska.

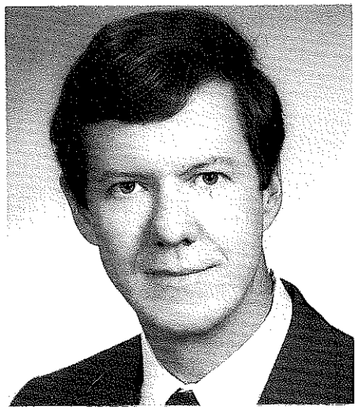
70s

'70 C. James Slizewski, BSc. Met. s potroom superintendent with Alcoa Tennessee. **Alan C. Noble, BSc.** lln. is principal geostatistician for Pincock, Allen & Holt, Inc. in Lakewood, olorado. **Robert T. Roberts, BSc.** lln. is an associate for Cummings, awrence & Vezina P.A. in Tallahassee, lorida. **David J. Spottiswood, PhD.** let. is head of mineral engineering nd extractive metallurgy at Curtin Uniersity in Kalgoorlie, Australia.

'71 James M. Bell, Geop. E. is a senior exploration geophysicist with NG Producing Co. in Denver, Colorado. **Jeffrey J. Danielski, BSc. Met.** is a senior division manager with Professional Service Industries, Inc. in Houston, Texas. **Alan N. Pike, BSc.** let. is president of National Executive esources in Denver.

'72 Steven J. Williams, BSc. Geol. nd **MSc. Geol. '75** is general manager/ xploration and production for Celsius nergy, Inc. in Denver, Colorado. **ohn R. Schuyler, BSc. Phy.** and **Sc. Phy. '77** is now affiliated with il & Gas Consultants International in urora, Colorado. He will be presentg industry courses in decision analys. **Franklin E. Grange, II, BSc. CPR, Sc. Min. Econ. '74** and **PhD. Min. con. '77** is manager/modeling and chnical analysis for Martin Marietta in nglewood, Colorado. **Donn B. Kraeher, BSc. Min.** is a patrol sergeant ith Lakewood Police Department in akewood, Colorado.

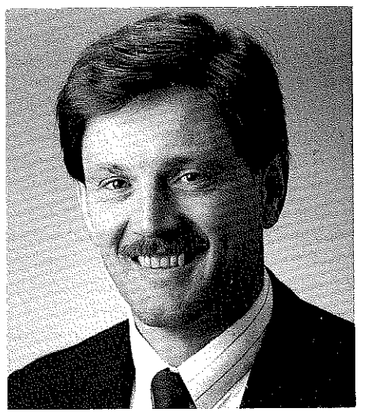
'73 Michael H. Conway, BSc. Met. nd **MSc. Met. '75** is senior director,



John Schuyler, '72, '77

process/specialty engineering for Fluor Daniel Corp. in Redwood City, California. **James J. Gusek, BSc. Min.** is a project engineer for Denver Knight Piesold Environmental Consultants, Inc. in Denver. **Ronald W. Pritchett, BSc. Geol.** is owner of Resource Projects. **Ervin E. Kukas, BSc. Geop.** is senior software engineer for Sierra Geophysics in Kirkland, Washington. **Scott E. Moravec, BSc. Geop.** is manager/interpretation research for Shell Development Co. in Houston, Texas.

'74 Michael J. Flanigan, BSc. Pet. has been named senior vice president in the energy banking division of NCNB Texas - Dallas. **Douglas L. Beahm, BSc. Geol.** is owner of BRS, Inc. in Casper, Wyoming. **Mark Vaivoda, BSc. Met.** is project manager/minerals group for BEI Engineers/Constructors Incorporated. **William D. Weege, BSc. Pet.** is production engineer for Rosewood Resources in Dal-



Michael Flanigan, '74

las, Texas. **Timothy J. O'Connor, BSc. Min.** is an engineer for Associated Electric Cooperative, Inc. in Huntsville, Missouri. **Douglas M. Ward, BSc. Pet.** has been named vice president/operations of Gold King Petroleum Corporation. He is in charge of the oil and gas activities of the company. **Danny P. Sprouse, BSc. Geol.** and **MSc. Min. Econ. '77** is manager/strategic planning for Union Pacific R.R. Production Co. in Texas.

'75 John C. Bozner, BSc. Geol. is a geological engineer for Triegel & Associates in Wayne, Pennsylvania. **Matthew A. Thiel, BSc. Min.** is a mine superintendent for Freeport McMoRan Gold Co. in Elko, Nevada. **Charles W. Truby, BSc. Pet.** is drilling operations manager/domestic and United Kingdom for Marathon Oil Company. **David R. Spedden, BSc. Met.** is benefication superintendent for Gardinier in Ft. Meade, Florida.

'76 Robert V. Nuccio, BSc. B.E. has retired as president of General Insurance Co. in California. **Andrew W. Extract, BSc. Min.** is senior mining engineer for Jim Williams Mining Pty., Ltd. in Applecross W.A., Australia. **John E. Watson, MSc. Min. Econ.** is chairman for Horizon Gold Shares, Inc. in Golden, Colorado. **Lawrence S. O'Connor, BSc. Geop.** is a sixth grade teacher at Laurelglen Elementary School/Panama-Buena Vista Union School District in Bakersfield, California.

'77 David W. Ashcom, MSc. Min. is director of environmental services for Sweet-Edwards/Emcon in Bothell, Washington. **W. John Robinson, Jr., BSc. Geol.** is a graduate student at Colorado School of Mines.

'78 Paul B. Reid, BSc. Geop. is with Digital Equipment in Federal Way, Washington. **Douglas M. Nordlander, BSc. Min.** has joined Pincock, Allen & Holt, Inc. in Lakewood, Colorado. He is responsible for general mine planning and project engineering, production scheduling, mine capital and operating cost estimates and mining software applications. **Tony (Johanet) Samitier, BSc. B.E.** is marketing manager/Latin America, Southwestern United States for Ingersoll Rand/portable compressor division. **Ted J. Huston, BSc. Chem.** is a research associate/ICP lab manager at the University of Michigan in Ann Arbor, Michigan.

E. Russell Lambert, III, PhD. CPR is artificial intelligence project coordinator/textile fibers group for Hoechst Celanese in Charlotte, North Carolina. **Gregory J. Stuart, BSc. CPR** is a chemist with Gates Energy in Denver, Colorado. **Kevin D. Jones, MSc. Met.** is a registered professional engineer (civil) and land surveyor in Wyoming. His office is in Evanston, Wyoming. **Brady J. McConaty, BSc. Pet.** is manager/supply development for Tenneco Gas in Houston, Texas. **William A. Skelly, M. Eng. Geol.** is an engineer with Westinghouse Hanford Co. in Richland, Washington.

'79 Carl H. Holzschuh, BSc. Min. is a construction engineer for the University of Missouri in Columbia, Missouri. **Mark E. Wolke, BSc. CPR** is a process engineer for M.W. Kellogg in Houston, Texas. **Joseph A. Zupan, BSc. CPR** is a senior staff engineer for the City of Austin in Austin, Texas. **William A. May, BSc. Met.** and **MSc. Met. '80** is group leader for Amax Research & Development Center in Golden. **L. Douglas Poole, BSc. Geol.** is a math/science teacher for the Department of Education, Government of Guam. **Harry L. Willard, BSc. CPR** is a staff petroleum engineer for Amoco Production in Houston, Texas. **Andrew K. Todd, BSc. Min.** is a project engineer for Emcon Associates in Fresno, California. **William S. Donovan, MSc. Pet.** is a petroleum engineer for Donovan Brothers, Inc. in Littleton, Colorado. **Bradley D. Pace, BSc. Min.** is a graduate student at Colorado State University in Ft. Collins, Colorado. **Scott M. Rosenberg, BSc. Met.** is general manager/sales and operations for Federal Communications Contractors, Incorporated.

80s

'80 Loren R. Lasky, MSc. Geol. is a project manager for Environmental Resources Management in Plainview, New York. **Nancy M. Durrani, BSc. CPR** is a chemical engineer for Conoco, Inc. in Ponca City, Oklahoma. **Jeff S. Baldauf, BSc. Pet.** is a senior staff engineer for Arco Oil & Gas Co. in Plano, Texas. **Javaid A. Durrani, PhD. Geop.** is a senior research scientist for Conoco, Inc. in Ponca City, Oklahoma. **Sharon (Carey) Hart, BSc. Geol.** is a financial analyst for the Colorado Commission on Higher Education in Golden, Colorado. **George F. Canjar, BSc. Geol.** is a staff geological engineer with Shell Western Exploration & Production in Bakersfield, California. **Julie (Straten) Gibbs, BSc. Geol.** is a petroleum geologist with Texaco USA in Midland, Texas. **Russell W. Kemp, BSc. CPR** is a senior process engineer with Rhone-Poulenc in Freeport, Texas. **Ronald M. Pratt, BSc. Math.** and **BSc. CPR '80** is a graduate student at Fuxin Mineral Institute in Fuxin, China. **Christopher J. Center, BSc. Geop.** is a marine research specialist for the University of Rhode Island in Narragansett, Rhode Island. **Douglas S. McKittrick, BSc. Met.** is a quality assurance process engineer with Western Forge Corporation in Colorado Springs, Colorado. **Bruce L. Neitzke, BSc. Pet.** is owner of Environmental Affairs in Colorado Springs, Colorado. **Robert R. Vogel, BSc. Min.** is operations manager/Georgia for Vulcan Materials Co. in Countryside, Illinois. **Erik B. Goodwin, BSc. Geop.** is with Shell Offshore, Inc. in New Orleans, Louisiana. **James V. Mahoney, BSc. CPR** is a plant foreman for Amoco Production Co. in Evanston, Wyoming. **Patrick G. Smyth, BSc. CPR** is manager/West Coast product supply for Mobil in Long Beach, California. **Edmund J. Werner, Jr., BSc. Min.** is pit operations foreman/Antelope Mine for Nerco in Douglas, Wyoming.

'81 Robert W. Baird, III, BSc. Geol. is an MBA candidate, 1990 at Duke University-Fuqua School of Business in Durham, North Carolina. **Christopher M. Nyikos, BSc. Min.** is a foreman for General Chemical in Green River, Wyoming. **Rebecca J. (Archer) Reid, BSc. Geop.** is a graduate student at the University of Washington. **Stephen C. Freeman, BSc. Pet.** is a senior reservoir engineer with Arco Alaska, Inc. in Anchorage, Alaska.

Roger P. Johnson, BSc. Met. is a senior metallurgist with Amax Gold-Nevada Gold Co./Sleeper Mine in Winnemucca, Nevada. **Gregory N. Schmidt, BSc. Geol.** is president/owner of Diamondback Oil Corporation. **George Taniwaki, BSc. CPR** and Susan K. Wolcott were married on August 5, 1989. The wedding was held at the Orrington Hotel in Evanston, Illinois. The couple will reside in Denver, Colorado, where Sue will be an accounting professor at the University of Denver and George will continue his electronic publishing consulting practice.

Clockwise starting with the groom are George, Susan, **Ann E. Hanson, BSc. Geop. '81**, Katrina D. Withers, **Gary R. Pekarek, BSc. Geop. '81, Thomas A. Brooks, BSc. Geop. '81**, Debbie Brooks, and Rueben W. Brooks.

'82 Eric F. Peterson, BSc. Pet. is a senior engineer for W.W. Irwin in Long Beach, California. **Eric M. Hughes, MSc. Min. Econ.** is a senior vice president of Mid County Bank & Trust in Norwood, Massachusetts. **Ernie Hafertepen, BSc. CPR** is a principal engineer with EG&G, Inc. in Lafayette, Colorado. **Roger L. Burch, BSc. Min.** is working for Timmins Construction/toxic waste control in Niagara Falls, New York. **Barbara A. Ringhofer, BSc. CPR** is manager/operations planning and coordination for Fletcher Oil & Refining Company in Wilmington, California. **Fereshteh Zia-Ebrahimi, PhD. Met.**, associate professor at the University of Florida, has been named a co-recipient of the Committee on Publications 1989 Award for the Outstanding Article in the American Society for Testing and Materials *Journal of Testing and Evaluation*. **Joseph R. Albi, Jr., BSc. Pet.** and **MSc. Min. Econ. '86** is a senior staff engineer for Apache Corp. in Denver, Colorado. **Tamara J. Muhic, BSc. CPR** is an engineering manager for PRC Environmental Management, Inc. in Denver. **David A. Scolman, BSc. Geop.** is a senior geophysicist for Corpus Christi Oil & Gas in Houston, Texas.

'83 Michael B. Curto, BSc. Met. was promoted to captain and took command of the 595th Maintenance Company in Sungnam, Korea. He also married Miss Pak Myong Suk of Yongbu, Korea. **Marianne Brozovich, BSc. Geop.** is project engineer with Law Engineering in Los Alamitos, California. **Michael E. Burnett, MSc. Met.** has been named manager/applications metallurgical laboratory in The Timken Company's steel business. **Lewis A. Hologne, BSc. CPR** is engineering manager for Grace Membrane Systems in Houston, Texas. **Frank H. Presley, BSc. Pet.** is a consultant for Presley Oil Co. in Denver. **William J. Prymack, BSc. CPR** is a nuclear engineer for EG&G. **Michael P. Long, BSc. Min.** is a design engineer/offshore West Africa for Chevron. **Patricia C. Petty, Hon. Mem.** was presented the Augusta Tabor Award by Women in Mining, Denver, Colorado chapter. The award, named for the wife of Horace A.W. Tabor, recognizes strength and leadership qualities. It is not awarded on an annual basis, but upon recognition only. **Randall R. Miller, BSc. Pet.** is field service department manager for Delta Environmental Consultants, Inc. in Tampa, Florida. **Roger A. Brady, BSc. Min.** and **BSc. Eng. '84** is project manager for Perland Environmental Technologies, Inc. of Tulsa, Oklahoma. **Karl A. Sauer, BSc. Min.** is an industrial hygienist for Homestake Mining Company in South Dakota. **Edith Trimmer, MSc. Min. Econ.** is a minerals analyst for Utah State Tax Commission. **John K. Samuel, BSc. Geop.** and **MSc. Math. '88** is data processing manager for Phoenix Geoscience.

'84 Jonathan C. Goodman, BSc. Geol. is vice president/mining analyst with Goepel Shields & Partners, Inc. in Toronto, Ontario. **Fred A. Kruse, MSc. Geol.** and **PhD. Geol. '87** is a research associate for the University of Colorado, Boulder, Colorado. **Daniel S. Meendering, BSc. Met.** is a metallurgist for Alcoa in Massena, New York. **Craig C. Schwyn, BSc. Geol.** is a hydrogeologist for Emcon Associates in San Jose, California. **Mark I. Tsesarsky, BSc. CPR** is a vice president with Salomon Brothers, Inc. in New York, New York. **James M. Otto, MSc. Min. Econ.** is chief technical advisor for the United Nations in Kuala Lumpur, Malaysia. **James E. Frey, BSc. Geol.** is a project software engineer with Teleco Oilfield Services in Middletown, Connecticut. **Emery L. Tracy, BSc. Min.** is an attorney with Kinney & Large in Minnetonka, Minnesota. **Joseph G. Vratil, BSc. Pet.** is a staff engineer for Texaco Trading & Transportation in Denver, Colorado. **Edmond G. Suher, BSc. Geol.** is a manager of Pioneer Drilling in Redlands, California. **Andrew F. Rosenfeld, BSc. CPR** is an associate refining engineer for Marathon Oil Co. in Kenner, Louisiana. **J. Steven Whisler, MSc. Min. Econ.** is senior vice president and general counsel for Phelps Dodge Corp. in Phoenix, Arizona.

Fereshteh Zia-Ebrahimi, '82

'85 Robert E. Moore, BSc. CPR is a project engineer for U.S. Oil & Refining Company in Gig Harbor, Washington. **Gina M. Morrison, BSc. Geol.** is an engineer for Cononie Environmental Services in San Mateo, California. **Kimberly S. Opekar, BSc. Geop.** is an environmental engineer for the Environmental Protection Agency in Denver, Colorado. **Thomas C. Anderson, BSc. Min.** is a chief engineer/mine superintendent in Round Mountain, Nevada. **Jeffrey P. Styers, BSc. Eng.** is an electronic engineer for Hill Air Force Base. **Stephen B. Doppler, MSc. Min. Econ.** is an associate mineral economist for Pincock, Allen & Holt, Inc. in Lakewood, Colorado. **Brick Smith, BSc. Pet.** and **MSc. Env. Sc. '89** is an environmental engineer for Terracon Environmental, Inc. in Ft. Collins, Colorado. **Pedro P. Vera, BSc. Min.** is a material control analyst for Unimin Corporation. **James H. Newlan, BSc. Met.** is a metallurgical engineer for Sundstrand in Denver, Colorado.

'86 Loren M. Sylvan, BSc. Math. is a member of the technical staff of US West Advanced Technologies in Denver, Colorado. **Cynthia L. Beech, BSc. Met.** and **MSc. Met. '89** is an associate engineer with Armco, Inc. in Middletown, Ohio. **Suzanne M. Lewis, BSc. CPR** is a process engineer with Merrick & Co. in Denver. **Kerry (Hoffman) Kalinski, BSc. CPR** is a technical service engineer with B.J. Titan in Lafayette, Louisiana. **Mary C. Jensen, BSc. Phy.** is an engineer for Lockheed Engineering & Sciences in Houston, Texas. **Thomas P. Yavarski, MSc. Chem.** is a chemist at the University of Michigan in Ann Arbor, Michigan. **Scott A. McKitrick, BSc. Geol.** is a geologist for Cactus Gold Mine Company in Tehachapi, California. **Samuel D. Urton, BSc. Eng.** is an engineer I for Chen Northern in Denver. **Christopher E. Kensel, BSc. Min.** is platoon leader in the U.S. Army, 10th Mountain Division in Ft. Drum, New York. **Kirsten L. Derr, BSc. Geop.** and **MSc. Env. Sc. '89** is an environmental engineer for Dow Chemical USA in Freeport, Texas. **Farid Motamed, BSc. Geol.** is a staff engineer with Leighton & Associates in Santa Ana, California.

'87 Fred H. Earnest, BSc. Min. is a mine superintendent/Johnny Gulch Mine for The Montana Talc Company in Ennis, Montana. **Rollin G. Socha, BSc. CPR** is an application engineer for Nalco in Carson City, Nevada. **Charles P. Hager, BSc. CPR** and **Renata Jarzabek, BSc. CPR** were married December 2, 1989 in Tustin, California. They are both working for Fluor Daniel as associate process engineers. **Verne C. Hornback, BSc. Phy.** is a process engineer for NCR/microelectronics division in Colorado Springs, Colorado. **Melanie K. Marquardt, BSc. Geop.** is a geophysicist for Arco Oil & Gas Co. in Houston, Texas. **Linda A. (Ross) Tekrony, BSc. CPR** is

an environmental engineer for the Environmental Protection Agency in Denver, Colorado. **Pamela L. (Drabek) Spath, BSc. CPR** is a process engineer for Stearns Roger in Denver. **Erin Jayne Nelson, BSc. Geol.** is a geological engineer for GeoEngineers in Bellevue, Washington.

'88 Larry C. Medina, BSc. CPR is a facility planning engineer for Arco Alaska, Inc. in Anchorage. **David N. Witter, MSc. Geol.** is a geologist for Shell Western Exploration & Production in Houston, Texas. **Nancy K. Roldan, BSc. Geop.** is a geophysical technician for Western Geophysical in Houston, Texas. **J. Scott Sammons, BSc. Eng.** is a platoon leader in the U.S. Army Corps of Engineers at Ft. Leonard Wood. **Gregory P. Nickel, BSc. Geol.** is a geologist for Asarco in Wallace, Idaho. **Samuel Chang, BSc. Pet.** and **BSc. Geop. '88** is working for Schlumberger Overseas S.A. in Thailand as a field engineer. His responsibilities include production logging, perforation, and surface welltest operation. **Scott D. Hendrick, BSc. Math. and BSc. Phy. '88** is a software engineer for Martin Marietta in Denver. **James Y. Lee, BSc. Pet.** is a systems operator for Kelt Oil & Gas in Los Angeles, California. **Gregory R. Vigil, BSc. Pet.** is a production engineer II for BP Exploration (Alaska) Inc. in Anchorage, Alaska. **Mary Jean Ford, BSc. Met.** is an associate materials engineer for Ball Packaging/metal container division in Arvada, Colorado. **Bruce G. Sachetti, Jr., BSc. Math.** is an analyst for Conoco in Ponca City, Oklahoma. **Sandra L. Schreiber, BSc. Eng.** is a project engineer for BP Oil in Washington. **Michael J. Morgan, BSc. Eng.** is an engineer for Collins Engineering in Chicago, Illinois. **Bruce G. Karr, BSc. Geop.** is a geophysical engineer with Halliburton Geophysical Services in Dhahran, Saudi Arabia. **Larry A. Quirk, BSc. Pet.** is a junior field engineer for Atlas Wireline Services. **Hui Son Chang, BSc. CPR** is an analyst IV for ENSECO-RMAL in Arvada, Colo-rado. **Ray M. Sadowski, MSc. Geochem.** is a geochemist for Applied Geotechnology Inc. in Bellevue, Washington. **Mark L. Johnson, BSc. Eng.** is a construction engineer/civil for KCI Constructors/M.W. Kellogg Co. in Lake Charles, Louisiana. **Eric S. Danas, Geop. E.** is a customer service manager for Ultrasonic Arrays, Inc. in Redmond, Washington. **Daniel J. Gralla, BSc. Pet.** is a senior petroleum engineer for Kelt UK Ltd. in London, England. **Mark J. Oberley, BSc. Eng.** is an ensign in the U.S. Navy. **Stephen C. Matthews, BSc. Met.** is a process engineer for Precision Metal Molding in Houston, Texas. **Brian K. Owens, BSc. Pet.** is a graduate student at Colorado School of Mines. **Wan Abul A. Wan Razali, BSc. Pet.** is a petroleum engineer for Shell Oil. **Geoffrey N. Smith, BSc. CPR** is a project engineer for Exxon. **Farris D. Perez, MSc. Min. Econ.** is working for Amoco Production in Denver, Colorado. **Abdul Wahid, MSc. Met.** is a graduate student at Colorado School of Mines. **Michael J. Zimmerman, BSc. Eng.** is an associate engineer for Silver Engineering. **L. Andrew Torres, BSc. Eng.** is a mechanical engineer with Phillips 66 in Borger, Texas. **Amy E. James, BSc. Met.** is a metallurgist/McLaughlin Mine with Homestake Mining Co. in Lower Lake, California. **Daniel J. Plazak, MSc. Applied Mech.** is working for Petrogulf Corp. in Denver. **Andrew L. Baker, BSc. Eng.** is a drilling engineer for Exxon in Midland, Texas. **Thomas M. Haard, BSc. Phy.** is a physicist for National Institute of Stan-dards & Tech. nology in Boulder, Colo-rado. **Beverly K. Luedke-Chan, BSc. Pet.** is a petroleum engineer for BP Exploration in Anchorage, Alaska. **Trent R. Henderson, BSc. CPR** is a process engineer for Merrick & Company in Los Alamos, New Mexico. **Whitney L. Hendrick, BSc. Eng.** is an engineering associate for Martin Marietta. **Richard J. Shimoto, BSc. CPR** is a process engineer for Shell Oil in California. **Diana L. Moss, PhD. Min. Econ.** is a senior economic analyst for the National Economic Research Associates in Washington, D.C.

IN MEMORIAM

Mines Magazine would like to express the condolences of the Colorado School of Mines Alumni Association staff and directors to the families and friends of the following alumni. Unfortunately, we do not have much information on the following individuals. If you have more information please write to the editor.

Stanley G. Cohen, P.E. '53, of Corpus Christi, Texas, died September 3, 1989.

Robert M. Hanes, E.M. '54, of Las Vegas, Nevada, died June 12, 1988.

Howard K. Loenshal, E.M. '51, of Soda Springs, Idaho, died September 25, 1988.

Howard K. Loenshal

Anselmo D. Claudio, E.M. '41, of Quezon City, Philippines, died August 23, 1989.

Edmund F. Vormwald, P.R.E. '50, of Clearwater, Florida, died September 19, 1989.

W. Kenneth Daggett, G.E. '35, of Dallas, Texas, died November 11, 1989. He is survived by his wife, Orris, and his son, W. Kenneth Daggett Jr., both of Dallas.

Robert H. Gunn

Robert H. Gunn, E.M. '57 and Geol. E. '57, of Salt Lake City, Utah, died October 25, 1989. He was 60 years old. He was born in Cripple Creek, Colorado.

He served as a manager in mining operations for Boyles Bros. Drilling Company in Salt Lake City, Utah. He worked as a miner, engineer, and project supervisor on shaft-sinking projects, as well as missile silos for the U.S. Corps of Engineers.

He is survived by his wife, Dixie Lee Maloy.

Darlene R. Pauli

Darlene R. Pauli, MSc. Mineral Economics 1989, was killed in an automobile accident January 1, 1990 in Denver. She was 30 years old, and had graduated in December from the executive program in the Mineral Economics Department.

Darlene had worked in the energy division of Colorado National Bank of Denver for five years as a staff geologist who monitored all of the oil and gas production data related to the bank's oil and gas loans. She was graduated from Colorado State University with a degree in geology (1982), and was viewed as a valuable professional and employee. Her contributions had been recognized by senior management of the bank and she had been nominated in December to receive special recognition for those accomplishments, an honor she never learned about because of her untimely death.

Dr. David Fletcher, professor of mineral economics and director of the executive program, explained in a eulogy that the executive program is a unique educational experience. In the 16-month program a strong bond develops between the participants, "not unlike a military boot camp." "The bonding occurs, and ties that cannot be broken are developed among these classmates. We only knew Darlene for a short time, but we loved her and our lives are enriched by our experience together," Fletcher said.

Darlene is survived by her parents, a sister and two brothers.

Many of Colorado National Bank's customers have also felt a loss, and in Darlene's memory a scholarship for the executive program has been established. Her family requests that any contributions be sent to the Darlene Pauli Scholarship Fund, c/o Colorado National Bank of Denver, P.O. Box 5168, Denver, Colorado 80217.

Darlene R. Pauli

William P. Morris

William Page Morris, E.M. 1930 and Mines Distinguished Achievement Award 1962, died October 4, 1989 in Houston, Texas. He was born September 21, 1907 in Ansted, West Virginia.

After graduating from Mines, Morris joined a coal company in Valier, Illinois as an engineer. From 1932-1940 he was a safety and haulage engineer for United States Potash Company, Carlsbad, New Mexico. Morris also worked as mine su-perintendent for another mining company in Carlsbad before becoming gen-eral superintendent of the Duval Corporation in Carlsbad.

Morris stayed with Duval for the remainder of his career eventually serving as president and director. He retired from Duval Corporation in 1972.

continued on next page

Dr. Stephen S. F. Hui

Editor's Note: the following eulogy was given by Dr. Lee Siu Kong, DIC and PhD.

Dr. Hui, Geol. E. 1940, E.M. 1940, Medalist 1974, and Honorary Doc. Engr. 1986 died November 21, 1989 at the Hong Kong Adventist Hospital. His sudden death came as a shock to many of his relatives, colleagues and friends. Life is full of unpredictable happenings, mostly sad happenings, that makes philosophy and religion all the more important to people especially elder people on the eve of their lives.

Dr. Hui died at the age of nearly 78 full years. A man at this age is classified by Chinese standard as a man of high longevity. But it is not the number of years of a person's life-span that counts. It is the brilliance and meaningfulness of one's life that really matter. Even when one's life was coming to an end, and yet one was trying hard to live on brilliantly and actively. That was Dr. Hui.

Some philosophers and writers made an analogy of a heroic man to the life-style of the cherry blossoms. These flowers, called Sakura in Japanese, have very short life-time of about ten days to two weeks. While the flowers are still in full bloom, the petals of the flowers suddenly detach themselves from the stalks and fall down to the ground like a shower of coloured snowflakes. Dr. Hui's life is analogous to the petals of the Sakura flower in that he enjoyed an active and normal life almost to the end of his life, and then suddenly disappeared bravely without moans and groans. In this sense, Dr. Hui was a heroic man.

Dr. Hui has now gone. He has made his permanent departure from us, from the earthly world. But his image and his spirit remain with us. His stout and medium-built physique and his cheerful and hospitable manners as appeared in the many happy occasions at dinner parties, on the beautiful lawns of Oi-Yuen (which literally means Garden of Love), at the buffet-lunch long benches under trees and so on will remain deep in our memories for a long time to come. During the many years of his later part of life in Hong Kong, Dr. Hui impressed us as a family man—an endeared husband and a good father. He was a kind elderman to the many members of the Huis greater family. Outside his home, he was a great friend to his many friends. He was a generous philanthropist. He was a devoted geological and mining engineer. And above all he was a humane and understanding leader and an able helmsman to the many companies and enterprises under his direction and control.

Of all the associations with the various universities, institutes, learned societies and professional bodies in which he had a personal interest, Dr. Hui took special pride in the two schools of mines, namely the Colorado School of Mines in Golden, Colorado, U.S.A. and the Royal School of Mines of Imperial College in London. Dr. Hui used to say that his academic "affection" for these two schools was equally divided between them, hence his donation several years ago towards these two schools was almost equally shared. The Anna and Stephen Hui Endowment Fund Fellowship Scheme is going strong in Imperial College. So far 16 geologists and mining engineers have been sponsored by the fund, mainly from mainland China, a few from Hong Kong. Many of them have gone back to China to give their services to the country. The seeds which Dr. Hui's many undertakings have sown will continue to grow and flourish in the many years to come.

As the last monument of his centre of interest, a geological research laboratory named after him was approved by the government and formally opened a few months ago in Shatin's industrial district with modern equipment and facilities. I had the honour of being consulted on the official title of this laboratory just before the Easter holidays. But none of us had foreseen that was the last time we worked together.

To this living world, Dr. Hui has bowed his curtain. Dr. Stephen Hui was unique! We missed him very much. He will always live in our memories.

Job Market Square

The CSM Alumni Placement Service works with several hundred companies across the United States. Frequently these companies contact the Alumni Placement Service when they have a position open. For a resume to be available to a prospective employer, you must be registered with the Alumni Placement Service. For details, call Kay Alexander (303) 273-3294. Toll-free numbers: Inside Colorado 1-800-245-1060, ext. 3294 and Outside Colorado 1-800-446-9488, ext. 3294.

POSITIONS OPEN (as of 2-16-90): **#50—PROCESS/PROJECT ENGINEER** will be responsible for process control and capital projects at facilities where ore is mined and processed using leaching and solvent extraction methods. Desire five years experience which should include design and construction of equipment, piping, pumps, tanks and instrumentation. **#51—MINE GEOLOGIST** at surface mine for industrial minerals with one to five years experience with grade control, scheduling, and extensive computer skills. Short-and long-range mine planning required, and work with production people. **#52—APPLICATIONS ENGINEER**—Answer customers' questions on electronics application and use. Research requests for new products and test new products.

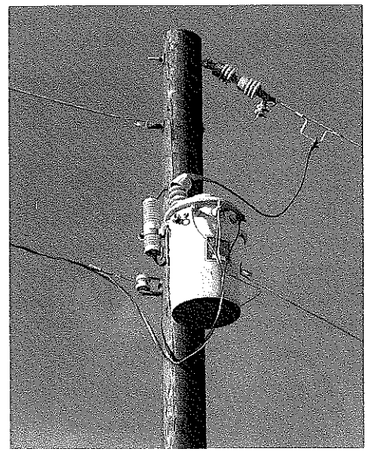
POSITIONS WANTED: #136— Engineering consulting, corrosion monitoring, chemical analysis, chemical sales and equipment inspection in petroleum refineries, gas plants and chemical plants. BSc. CPR '87. **#137—R&D ENGINEER**—Experience includes quality control systems development, material selection and failure analysis. Excellent technical writing and computer skills. BSc. Met. '79. **#138—DESIGN/ASSOCIATE ENGINEER**—Responsible for research and development of new products. Purchase and/or advise on purchase of all necessary equipment. Designed variety of systems for projects: electronic, heat transfer and mechanical. Computer skills. BSc. Engineering, Electrical '89. **#139—MINE MANAGER**—Experience in surveying, mapping, ore control, mine planning and scheduling. Heap leach gold mine. Safety. Reg. Prof. Eng. BSc. Min. '72

Rebuild the 'M'

continued from page 18

stories and material will be collected for a history of the "M".

Buy your bulb now for graduation, reunion, Father's Day—a great gift idea! Buy one or more bulbs for $32.00 each. For further information, call (303) 273-3234 or send your check to Colorado School of Mines, Blue Key "M" Fund, c/o Connie Casey, Student Activities Office, Colorado School of Mines, Golden, CO 80401.



Thanks to the Class of '52 the "M" has a new power system.

CSMAA Placement Service:

1. Gives prompt and careful consideration to applicants.
2. Matches applicants with suitable positions and submits correct resumes to the employer.
3. Handles all contacts for the applicant in a professional and confidential manner.

The Alumni Applicant:

1. Requests applicant information from the Alumni Placement Service.
2. Completes and returns the agreement form.
3. Responds immediately to requests from the Alumni Placement Service for information.
4. Advises the CSMAA Placement Service about interviews, offers and status.

Let us help you with your job search.
Companies working with us need varied qualifications and experience.
Applicants and Employers—Call us NOW! (303) 273–3294
Toll-free numbers: Inside Colorado, 1-800-245-1060, ext. 3294
Outside Colorado 1-800-446-9488, ext. 3294.

COLORADO SCHOOL OF MINES ALUMNI PLACEMENT SERVICE

Please send more Alumni Placement Service information to me:

❑ Employer ❑ Applicant

Name_____

Street_____

City_____ State_____

Phone_____ Zip_____

Kay Alexander, CSM Alumni Placement Service
P.O. Box 1410, Golden, Colorado 80402

PROFESSIONAL CARDS

Accountants

WHITE & COMPANY, P.C.
CERTIFIED PUBLIC ACCOUNTANTS

- PERSONAL FINANCIAL PLANNING
- BUSINESS & TAX PLANNING
- ACCOUNTING SYSTEMS DESIGN
- BOOKKEEPING SERVICES
- ACCOUNTING SOFTWARE

Suite 650 (303) 986–9233
143 Union Blvd. **JOHN H. WHITE CPA '66**
Lakewood, Colo. 80228 PRESIDENT

Acquisitions

V.A. ISAACS & ASSOCIATES, INC.
Advisors for Oil & Gas Property
Acquisitions and Divestiture

V. A. (Bud) Isaacs, Jr. '64 PE
Richard D. Griffis '83 PE
Daniel H. Silverman '88 ME

7430 E. Caley Ave., Suite 310
Englewood, Colorado 80111
(303) 694-3205 - Office
(303) 694-3844 - Fax

Assaying

SKYLINE LABS, INC.
SINCE 1967
Co Ni Cu Zn Ge In
Rh Pd Ag Cd Sn Tl
Pt Au Hg
ASSAYING
GEOCHEMISTRY
GORDON H. VAN SICKLE '61
DENVER (303) 424-7718
WILLIAM L. LEHMBECK '62
TUCSON (602) 622-4836
RENO (702) 355-8826

Comminution

Morgårdshammar MINING
Daniel P. Monchak
Sales Manager North America
MORGÅRDSHAMMAR INC.
4155 E. Jewell Ave. • Suite 202 • Denver, Colorado 80222
Tel: (303) 691-0235 Fax: (303) 691-0231
Specializing in application and sales of crushing and grinding equipment.

Computer

Planning & Evaluation Technology™
Business Modeling and Decision Tools
Short Courses in Decision Analysis
JOHN R. SCHUYLER '72 '77
15492 East Chenango Avenue
Aurora, Colorado 80015 (303) 693-1883

DIRECTORY OF MINING PROGRAMS
COMPUTERS & MINING NEWSLETTER
- Mining Software Evaluations
- Program Searches and Comparisons

Contact: **Betty L. Gibbs, '69, '72**
GIBBS ASSOCIATES
P.O. Box 706, Boulder, CO 80306-0706 (303) 444-6032

TECHBASE
"Engineering Software for Solving Real World Problems"

- Database
- Graphics
- Pit Design
- Reclamation
- Lerchs-Grossman 3-D Optimizer
- Statistics
- Modeling
- Geostatistics
- Monitoring
- Data Analysis

Michael N. Norred '78
MINEsoft Ltd.
1801 Broadway, Suite 910
Denver, CO 80202
(303) 292-6449 • FAX (303) 298-7351

Concrete

PHOENIX REDI - MIX COMPANY, INC
THOMAS M. VALENTE
President
3635 South 43rd Avenue
Phoenix, Arizona
(602) 272-2637

Consultants

Michael J. Berndtson, 1985
Senior Staff Engineer

Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists

Stanford Place 3, Suite 1000
4582 South Ulster Street Parkway
Denver, Colorado 80237
(303) 694-2770
Fax (303) 694-3946

EMTEC
FRED R. SCHWARTZBERG, P.E.
Metallurgical Engineer
ROCKY MOUNTAIN
ENGINEERING AND MATERIALS TECHNOLOGY, INC.
An Engineering Consulting Firm
1325 S. Colorado Blvd., Suite 304
Denver, Colorado 80222 (303) 692-0660

Contractors

Office (303) 825-6357
FAX 893-4706
350 LIPAN STREET
DENVER, CO 80223
JAMES R. HOWELL & CO., INC.
Since 1935
GENERAL CONTRACTING
Jim Howell, '66
Bob Howell, '39

Exploration

Magnetic Signal Company
Ground Magnetic & VLF-EM Surveys
Saadi A. Kafaji, '65
Chief Geophysicist
2330 So. Kearney
Suite 406
Denver, CO 80222
(303) 691-9849
(303) 773-6740

Registered Geological Engineer
Colo. P.E. #7067
A.I.P.G. #1836
P. A. "Art" Meyer '50
Consulting Engineer
2834 Pierson Way
Lakewood, CO 80215 (303) 233-8115

PEARSON, DeRIDDER & JOHNSON, INC.
EXPLORATION CONTRACTORS
Geology Geophysics Management
12860 W. Cedar Dr., Suite 102, Lakewood, CO 80228
(303) 987-1114
William C. Pearson, '70 Robert C. Johnson, '61
Edward DeRidder, '73 Robert N. Schnepfe, '56

Geophysics

FRITZ GEOPHYSICS
Mining Geophysics and Computer Applications
Frank P. Fritz, '65
Consultant
12823 West 3rd Place (303) 985-1828
Lakewood, CO 80228 (303) 985-1904
United States

Geophysical Development Corporation
FRED J. HILTERMAN, '63
VICE-PRESIDENT - DEVELOPMENT
8401 WESTHEIMER, SUITE 105
HOUSTON, TEXAS 77063
(713) 782-1234 BUSINESS
(713) 467-2599 HOME

Schlumberger
SCHLUMBERGER WELL SERVICES
NORTH REGION
VICKI COWART
GEOPHYSICAL MANAGER
7800 East Union Avenue
Suite 610
Denver, CO 80237
Off.: (303) 796-0239
Mobile: 888-7115

MGC
MICROGEOPHYSICS CORPORATION
10900 WEST 44th AVENUE
WHEAT RIDGE, COLORADO 80033
(303) 424-0499
DAVID BUTLER 1969

mining geophysical surveys INC
Magnetic, Gravity, Induced Polarization,
Resistivity and Electromagnetic Surveys
Induced Polarization
and Resistivity Drill Hole Logging
W. GORDON WIEDUWILT '53
2400 East Grant Road, Tucson, Arizona 85719
Telephone (602) 326-8619

COLOG INC.
BOREHOLE GEOPHYSICS
Electrical—Nuclear—Acoustic
• Ground Water • Monitor Wells • Minerals & Energy • Geotechnical
- Worldwide Slimhole Well Logging Services
- Mt. Sopris Portable Equipment Rentals
- Mini-Loggers to 1300°—Multi Conductor to 6000'
- PC Based Digital Acquisition Systems & Software
- Dot-Matrix Plotting Software—Lotus Compatible
- Consulting and Training

1919 8th Street • Golden, CO 80401 • (303) 279-0171

CHD CANADIAN HYDRODYNAMICS INC.
PRESSURE DATA & INTERPRETATION
N. M. (Nor) Hannon
#1630, 444 - 5TH AVENUE S.W.
CALGARY, ALBERTA T2P 2T8
PHONE 269-5416

Investments

SHEARSON LEHMAN HUTTON
An American Express company
AMERICAN EXPRESS
Richard T. Reseigh '66
Financial Consultant
Shearson Lehman Hutton Inc.
370-17th St., #1100
Denver, CO 80202
Telephone: 1 (303) 572-4090
1 (800) 525-3041

Lobbyist

FRANK DEFILIPPO, '72
PROFESSIONAL CONTRACT LOBBYIST
MELLON FINANCIAL CENTER
1775 SHERMAN STREET, SUITE 1345 303-832-5556
DENVER, COLORADO 80203 820-6321 PAGER

Machinery

Engineering and
Equipment Service
for Mines—Mills—Industrial Plants
Engineering Consultants—Plant Layout
Equipment Consultants—Design
Pollution Control Equipment
and Pumps, Cranes, Fans
Centrifugal Exhausters
PATTEN ENGINEERING CO.
1740 W. 13th Ave. Denver 80204
573-5333

OEA
Ahmed D. Kafadar '42, '43
Chairman
OEA, Inc.
P.O. Box 10488
Denver, Colorado 80210 (303) 693-1248

Metallurgy

Titanium Components Inc.
NEWELL H. ORR
President
P.O. Box 1138 (201) 964-8520
West Caldwell, NJ 07007

(303) 670-0976
670-0847
TERRY McNULTY, D.Sc., P.Eng.
CONSULTANT
MINERAL AND CHEMICAL INDUSTRIES
T.P. McNULTY AND ASSOCIATES, INC.
P.O. BOX 2740
EVERGREEN, CO 80439

J. P. Dempsey, '49
Registered & Chartered Engineer
Extractive Metallurgy **3918 Winchester Rd.**
Mineral Processing **Lakeland, FL 33811**
Development **813/646-0002**
/Management

J. NICK TEETS, *president '67*
The WILKINSON Company precious metals
Call Toll-Free # to 1-800-822-GOLD
31011 Agoura Road • Westlake Village, California 91361 • (818) 889-0050

BEI
ENGINEERS/CONSTRUCTORS
GARY K. GANTNER '65, PRESIDENT
FULL SERVICE
ENGINEERS/CONSTRUCTUORS
777 S WADSWORTH BLVD.
LAKEWOOD CO 80226 (303) 989-4921

Mineral Economics

ELLIS INTERNATIONAL SERVICES, INC.
Geology · Economics · Databases
Trevor R. Ellis, '78
Geologist & Mineral Economist
600 Gaylord St.
Denver, CO 80206-3717, USA
Phone: (303) 399-4361
• Reserve Evaluation
• Investment Analysis
• Acquisition Appraisal
• Market Studies

Mining

MARK FRAUENHOFF '76
Consulting Mine Engineer
Coal Mine Planning & Design
Digitizing • Plotting Reserve Estimation
Computer Applications Mine Evaluation
P.O. Box 1233 **Suite 205, 104 S. Missouri**
Claremore, OK 74018 **(918) 341-8415**

BEHRE
DOLBEAR & COMPANY, INC.
Minerals Industry
Consultants
1601 Blake Street
Suite 510
Denver, Colorado 80202
Richard Waissar '62 TEL: (303) 620-0020
Robert L. Sandefur '66 and '73 TLX: 640103
Alva L. Kuestermeyer '82 FAX: (303) 620-0024

Tim Buchanan, BSc.Min. '83
Neil B. Prenn, P.E., E.M. '67

MINE DEVELOPMENT ASSOCIATES
MINE ENGINEERING SERVICES
SURPAC MINING SYSTEMS

702-323-5700
230 Rock Blvd., Suite 29
Reno, Nevada 89502
Telecopier: 702-323-6053

Pincock, Allen & Holt, Inc.
International Natural Resource Consultants
A member of The Robertson Group

- Ore Reserves
- Mine Hydrology
- Mine & Mill Planning
- Groundwater & Environmental Studies
- Underground Mining
- Open Pit Mining
- Computer Modeling
- Economic Evaluations
- Market Studies
- Industrial Minerals

274 Union Boulevard, Suite 200 Lakewood, Colorado 80228
303/986-6950, FAX 303/987-8907, Telex 66-6457

Richard Addison, '68 — Douglas H. Brown, '87 — Alva L. Kuestermeyer, '82 — Randall K. Martin, '77, '78
Alan C. Noble, '70 — Robert H. Robinson, '64 — Donald B. Tschabrun, '81

LAWRENCE E. SMITH, MET. E. 1931
Consultant
PHILEX MINING CORPORATION
P.O. Box 1201 MCC
Makati, Rizal, Metro Manila, R.P.
32,000 MTPD Block Cave—Cu. Au. Ag.

James M. Link, Inc.
Consulting Engineers
James M. Link, '59
410 Seventeenth Street, Suite 2420
Denver, Colorado 80202
(303) 825-1184 (303) 985-7985

M. A. BALCAR AND ASSOCIATES, INC.
Complete Mining Engineering Services

- In Situ Stress Testing
- Ore Reserves
- Mine Design and Planning
- Rock Mechanics
- Bankable Economics Packages
- Full Computer Services

Mark A. Balcar, President '77
410 Seventeenth Street, Suite 2420
Denver, Colorado 80202
303/825-1119

REMENCO CORPORATION
Engineering & Management Services to the Mining Industry Since 1976
Robert T. Reeder, E.M. '49, P.E.
Chairman
1201 6th Street
Golden, CO 80403 **279-4445**

ACZ inc
Providing Engineering & Environmental Services

- Mine Planning
- Feasibility Studies
- Reserve Analysis
- EIS / EA Preparation
- Permit Acquisition
- Computer Modeling

Alan Czarnowsky '75
Conrad Parrish '77
Jerry Nettleton '78
Robert Peterson '78
Thomas Leidich '82
Mark Montoya '85

1475 PINE GROVE RD. SUITE 205
P.O. Box 774018 – STEAMBOAT SPRINGS, CO. 80477 – (303) 879-6260

GROSVENOR ENGINEERING COMPANY
Niles E. Grosvenor, E.M. '50
David E. Krebs E.M. '66
709 W. Littleton Blvd.
Littleton, Colorado 80120 Mining &
Office: (303) 798-0181 Geological Consultants

Mining Geology

DAVID C. JONSON Geol.E. '51, M.S. '55
CONSULTING GEOLOGIST

- MINERAL EXPLORATION
- MINE GEOLOGY
- PROPERTY EVALUATIONS

1530 ALKIRE ST.
GOLDEN, COLORADO 80401
(303) 232-2013 FAX (303) 233-1525

Personal Services

STUART E. BENNETT, D.D.S.
Family Dental Care
CPR 1966
INDIAN CREST
(303) 422-9172 7913 Allison Way Arvada, CO 80005

Petroleum

SERVIPETROL LTD.
ROBERTO AGUILERA
M.Eng. '71, Ph.D. '77
International Petroleum Consultants
Naturally Fractured Reservoirs
Log Interpretation
Well Test Analysis
Performance Forecasts
Economics
Petroleum Short Courses
P.O. Box 7010 Calgary, Alberta
Postal Station E T3C 3L8
Tel: (403) 266-2535 Telex: 03-827538

BART DE LAAT CONSULTANTS
Petroleum & Natural Gas
Bart De Laat, P.E. 1930
Reserves, Appraisals, Financial Studies
Operations, Special Problems
11215 Hermosa Ct.
Houston, Tex 77024 (713)782-3734

H. K. VAN POOLLEN
'50, '55
PETROLEUM CONSULTANT
Box 121, Shawnee, CO 80475
(303) 838-7168

M.S. Patton, Jr. '40 **Mark V. Patton '70**
Graybol-Patton Company
InterRep/Protec
7136 S. Yale, Suite 200
Tulsa, OK 74136
(918) 493-6101 **Telex: 88081**

Questa Engineering Corporation
International Petroleum Consulting Services
Dr. John D. Wright 69' 85'
Richard F. McClure 82' 86'
Brian R. Disney 81'
Herschel Vaughn 70'
1019 Eighth St. Suite 200
Golden, CO 80401
(303) 277-1625
FAX (303) 278-3461

LONG Consultants, Inc.
Independent Petroleum Engineers
D. R. Long
President
P.E. '67
1100 Milam, Suite 2380, Houston, Texas 77002
713-650-8828

AUSANKA
OIL OPERATIONS
FRANK AUSANKA
P.E. '42
(817) 723-7321
4719 Taft Boulevard—Suite 5
Wichita Falls, Texas 76308

Haley Engineering Inc.
International Petroleum Consultants
John D. Haley '48
5601 S. Broadway, Suite 360
Littleton, CO 80121
(303) 795-8578
Telex 4322128 JDH UI

DAVID E. SMINK, P.E. '57
Petroleum Consultant
(303) 798-9973
Petroleum Engineering 5000 Bow Mar Dr.
Expert Witness Testimony Littleton, CO 80123

Edward Engineering
PETROLEUM CONSULTANTS
888 SOUTH LIPAN, SUITE C
DENVER, COLORADO 80223
(303) 936-0161
DARRYL E. PIERCE, PRESIDENT

Peter J. Baer
PETROLEUM CONSULTANT
P.E. 1962
Telephone: (215) 431-9607
317 WEST MINER STREET
WEST CHESTER, PA 19382

Jerry R. Bergeson & Assoc.
Petroleum Consultants
Completions, Evaluations,
Log Analysis, Reservoir Studies
607 19th St., Golden, CO 80401
303 279-6908

ROBERT E. MILLER '59
Oil & Gas Exploration
1300 S. FRAZIER
SUITE 102
CONROE, TEXAS 77301 **756-9765**
A/C 409

Process Engineering

MERRICK
Merrick & Company
P.O. Box 22026
Denver, Co. 80222
303-751-0741
JOE MAHONEY '86
RALPH TOWNSEND '64

PROCESS ENGINEERING SERVICES
- OIL & GAS
- REFINING
- CHEMICALS
- MANUFACTURING

Resource Exploration

Red Rock Resources Ltd
Ian H. Mackay D.Sc. P.Eng.
Geol. Eng. '53
440 Aquitaine Tower
540 Fifth Avenue S.W.
Calgary, Alberta, Canada
(403) 294-1234 T2P0M2

COLORADO SCHOOL OF MINES WILL PAY YOU

A GUARANTEED INCOME FOR LIFE

Would you like to lock in a guaranteed income for life and receive an income tax deduction this year? Colorado School of Mines offers all of this to you, and more.

It's called a Charitable Gift Annuity. In exchange for your gift of cash, stocks, bonds, mutual fund shares or other property to Mines, you receive regular income payments for life—a portion of which are tax-free—and a tax deduction now.

Here's how it can work:

Mr. and Mrs. Jones, both age 60, wish to generate additional income for retirement. They contribute $10,000 to establish a Charitable Gift Annuity. Mines will pay them a guaranteed $660 a year for life, of which $200 is tax-free. In addition, the Jones can claim an income tax charitable deduction of $4,104 this year.

Find out how a gift to Mines will produce retirement income and multiple tax savings for you. Simply return the coupon at right or call (303) 273-3141.

☐ Please send me more details about lifetime income opportunities. I understand there is no obligation.

Name _____
Address _____
City/State/Zip _____
Telephone _____

Mail to: Mr. Shea McGrew, Director of Planned Giving
Office of Institutional Advancement
Twin Towers, 1811 Elm Street
Golden, Colorado 80401
Or call: (303) 273-3141

Colorado School of Mines
America's premier school of engineering and earth sciences.

Membership

continued from page 26

Marshall C. Crouch, III (Geol E. '67) served as president of the association in 1980. He serves as a caller for the three Denver alumni sections, and is a class agent. He was instrumental in organizing a well-attended 20th class reunion in 1987, and his dedication and service to the association have been unsurpassed.

Dr. Michael S. Nyikos, former vice-president of student affairs at Mines, served as the CSM president's personal representative to the association. He made a valuable contribution to the operation and advancement of both the association and the alumni in general. Nyikos attended numerous section meetings around the country, and was always available to alumni and students. He left Mines last year to become vice-president of development at Mesa College in Grand Junction. Nyikos' son, Chris, is a 1981 graduate of Mines.

Dr. Craig Van Kirk, head of the Petroleum Department at Mines and a Mines graduate (PhD. Pet. '72) makes it a point to attend student and alumni functions, including the banquet for graduating seniors, and has quietly made a point to sponsor all the graduating seniors in the Petroleum Department who were not being sponsored for the banquet by an alumnus.

Each spring Van Kirk gets involved in the reunion weekend by sponsoring a reception for graduating petroleum engineering students, their parents, and visiting alumni. He has served numerous times as a speaker for alumni section meetings.

Mines Magazine

Colorado School of Mines Alumni Association May, 1990