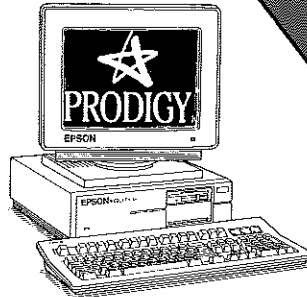


**Golden's best-kept secret:
State-of-the-art Computing**

SPECIAL OFFER FOR MINES ALUMNI!

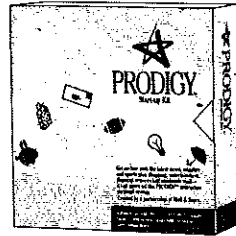
\$995
EQUITY[®] Ie



Graduate Special

- Full 640KB RAM Internal Memory
- Fast 8/10 MHz 8086 Microprocessor
- Dual 3.5" 720KB Floppy Configuration
- 2400 Baud Modem Included
- VGA PW Mono Monitor - 12"

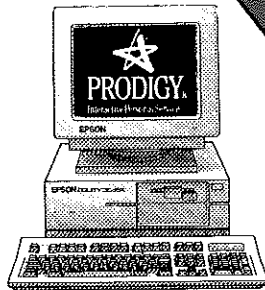
Prodigy[®]
Interactive
Personal
Service



COMPLIMENTARY

- Free Prodigy software installed
- First 60 Days Service FREE
- No Online Charges
- Electronic mail lets you stay in touch with friends and classmates
- A whole new world of communication, information, shopping and fun . . . right from your home!

\$2,315
EQUITY[®]
386SX
PLUS



Professional Special

- 16MHz 80386SX 40MB System, VGA Built in
- Advanced MS-DOS[®] 4.01 Software Included
- 2MB of Standard RAM
- 2400 Baud Modem Included
- VGA PW Mono Monitor - 12"

OFFER EXPIRES DECEMBER 31, 1990

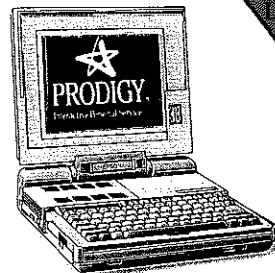


Random Access, Inc.

2370 South Trenton Way
Denver, Colorado 80231
MAIN: 303/745-9600 • FAX: 303/745-0242

TOLL FREE: 800/422-2383

\$2,895
EQUITY[®]
LT-286E
LAPTOP



Travelers Special

- 12MHz 80C286 Microprocessor
- "Pop out" 40MB Hard Disk Drive
- Weighs 17 Lbs.; 13 Lbs. without Removable Battery Unit
- 2400 Baud Modem Included

TERMS: MasterCard, VISA, Discover or C.O.D.
SHIPPING & HANDLING: 3% of System Cost
SERVICE: Call our nationwide, toll free number for the nearest Epson Service Center.

WHEN YOU'VE GOT AN EPSON,
YOU'VE GOT A LOT OF COMPANY. **EPSON[®]**

A PORTION OF SALES IS DONATED TO THE COLORADO SCHOOL OF MINES ALUMNI ASSOCIATION.

Epson and the Epson Logo are registered trademarks of Seiko Epson Corporation. Equity is a trademark of Epson America, Inc. Prodigy and the Prodigy logo are registered trademarks of Prodigy Service Company. All other product, brand or trade names are trademarks or registered trademarks of their respective owners.

Mines Magazine

Colorado School of Mines

October 1990

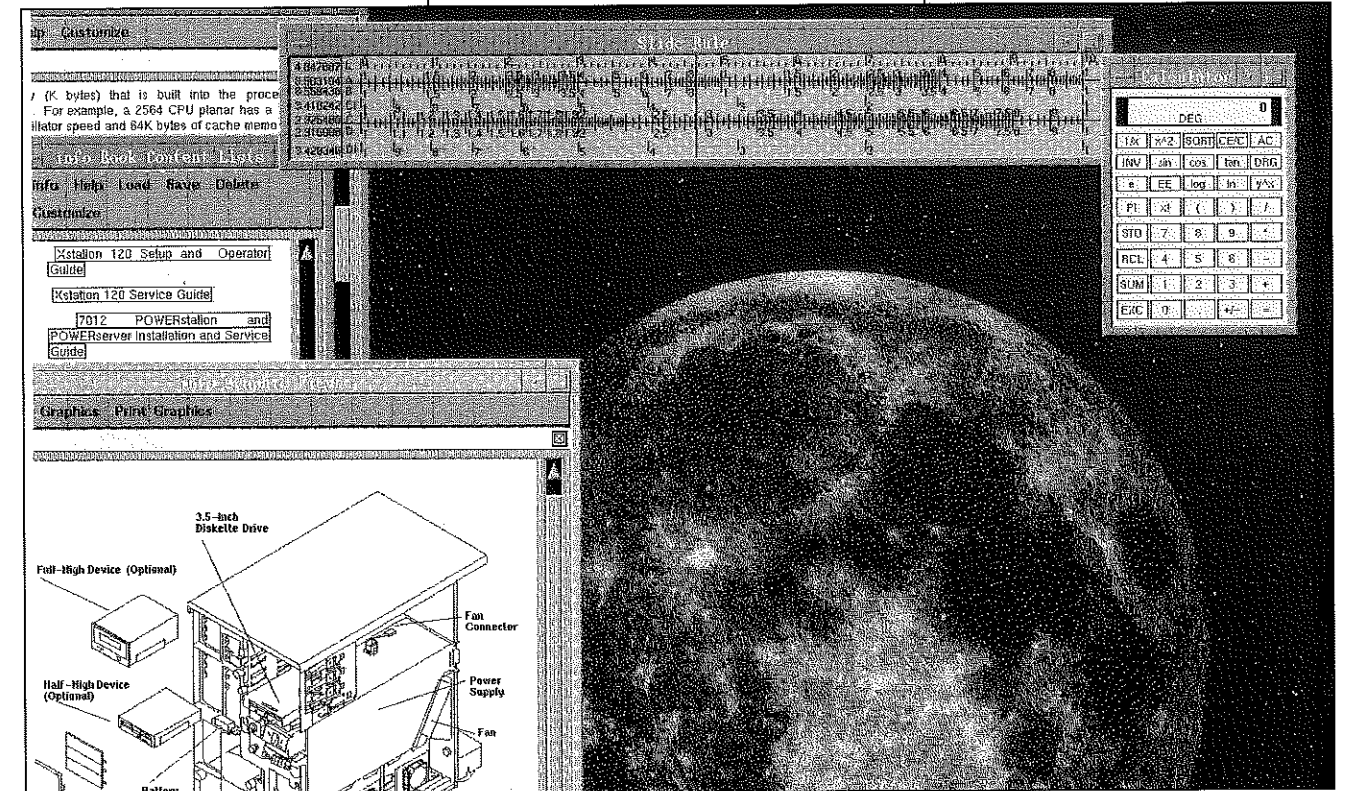
Volume 80

Number 7

3 Campus Computing in the 1990s . . . Building an Environment for People
by Derek Wilson.

13 Calgary Alumnus Recalls Service to Kuwait, by Ellen Glover. Gulf crisis triggered by "greedy neighbors."

17 Library Without Walls, by Ellen Glover. Future of CSM's library lies with high tech.



10 Computer Science Education at CSM

by Dr. Jean Bell
Is Mines teaching computer packaging or computer science?

Cover

Welcome to Golden, the growing local answer to the Silicon Valley (poster available from CSMAA office).

15 Seniors Cap Off Engineering Education,

by Ellen Glover.
New multidisciplinary approach matches education with industry.

2 Editor's Corner

19 Director's Desk

20 Sections

21 Under the "M"

26 Letters

29 Calendar

30 Alumni Updates

33 In Memoriam

37 Professional Cards

40 Alumni Placement

Colorado School of Mines Alumni Association

1990 OFFICERS:

James G. Johnstone, Geol. E. '48,
President, Lakewood, Colorado
J. Paul Mathias, P.E., '63,
President-Elect, Englewood, Colorado
Vicki J. Cowart, MSc. Geop., '77,
Treasurer, Denver, Colorado
Gary L. Hutchinson, E.M. '62,
Secretary, Denver, Colorado

DIRECTORS:

Norbert N. Hannon, Jr., Geol. E. '47
Tim Hoops, BSc. Geol. '79
James F. Huff, Geop. E. '53
Terence P. McNulty, DSc. Met. '67
William M. Mueller, Met. E. '40
James D. Mulryan, E.M. '54
Kenneth W. Nickerson, Geol. E. '48
Newell H. Orr, Met. E. '54
Stephen A. Sonnenberg, PhD. Geol. '81
Gregory K. Staff, BSc. CPR '73
J. Nick Teets, Met. E. '67
W. Gordon Wieduwilt, Geop. E. '53

CSMAA STAFF

Kay Alexander
Placement Director
Judy Arbuckle
Administrative Assistant
Kathy Breit
Bookkeeper
Mary Jo Giddings
Associate Director, Alumni Services
Betty Myers
Records
Corlee Rutherford
Records
Norman R. Zehr
Executive Director, E.M. '52
Ellen Glover
Editor
Deborah Mooney
Magazine Assistant
Elaine Soldinger
Advertising Sales

MINES ANNUAL FUND

Laura Robinson
Director

CSMAA ADDRESS AND PHONE:

P.O. Box 1410
Golden, Colorado 80402
(303) 273-3295
FAX: (303) 273-3165
Toll Free Inside CO: 1-800-245-1060
Toll Free Outside CO: 1-800-446-9488

MINES MAGAZINE (#ISSN 0096-4859) is published monthly except March, July, Sept., and Dec., by Colorado School of Mines Alumni Assn., 1811 Elm St., Golden, CO 80401. Second Class postage paid at Golden, CO and additional mailing offices. POSTMASTER: Send address changes to MINES MAGAZINE, P.O. Box 1410, Golden, CO 80402. Subscription price: non-alumni subscribers, \$30 per year United States and Canada; \$35 foreign surface mail; \$75 foreign air mail. Single copies \$2, except special editions. Directory issue, \$50 for non-members.

EDITOR'S CORNER

Of computers, microwaves and automation

For a long time my home has reflected a certain low-tech attitude in contrast to the fast-paced world around us. Computers and Nintendo have not invaded the family room, and for years I have cut the grass with a simple gas mower adding the clippings to the compost pile. Our old stereo speakers are made of real wood, and we haven't gotten around to buying a compact disc player yet.

Our kitchen also reflects this attitude; we managed to survive without a microwave for several years until the baby starting screaming for food *now*. Let me tell you that a zapped Gerber dinner makes you search for the real thing. And I prefer a sharp knife and large maple cutting board to a six-piece food processor when preparing most meals—fewer dishes to wash later.

The rush to adopt time-saving devices has always amused me whether it be in the home or the office. I often wonder if they truly lessen the amount of time spent on a task, or if they generate new kinds of work rather than relieving people to become more creative. The popularity of desktop publishing over the last few years is a good example; competent editors, writers, researchers and other professionals are spending valuable time learning graphic arts, design and printing to produce newsletters and reports when they might be better served by calling in a graphic artist or handing over a computer disc to a full-service printer.

More than once while I was photographing an event I have been stopped by a person confounded by an automatic camera—the batteries have failed at a crucial moment and the poor amateur is left with a large, expensive and totally useless camera. I usually collect the person's business card and send them a photograph taken with my old, reliable manual camera.

Time saving devices, including computers, are wonderful if you have the time to use them. The lack of electronic equipment in my home is not a

conscious effort to exclude high technology; it reflects the interests of a family who would rather spend time together outdoors than have this half of the two-paycheck couple racing through the house with laundry dripping from an overflowing basket, vacuum cleaner in tow, answering the call of the beeping microwave.

Granted, my perspective is simplistic, but it is a comfortable one—family before technology. When you apply the same perspective to a computing environment at the School of Mines you have to ask yourself "what comes first—people or technology?" The CSM Academic Computing Center (see related stories) is building a campus-wide computer system which will tie computer technology to curriculum. Administrators' decisions will have some long-term effects, but Derek Wilson, computing center director, is trying to build some flexibility into the system which will allow students and faculty to change the curriculum as technology changes rather than becoming locked into a rigid single system. "No one carries slide rules or large calculators anymore, and you wouldn't plan courses around those outdated technologies. Computers are so pervasive in our lifestyles we are sometimes overwhelmed by them; we'll be fine if we keep in mind the people who use and interact with the computer system," Wilson said. "The technical aspect of the computing environment should, as much as possible, adapt to the changing needs of the people who use it so it will be viewed as an enabling technology."

Mines has a unique opportunity to have technology actually do what the people at the school need it to do, rather than have the technology dictate what will be taught simply because it is in place. How resources are spent, and what tack people take, will prove interesting to watch.

Ellen Glover

CAMPUS COMPUTING IN THE 1990s ...BUILDING AN ENVIRONMENT FOR PEOPLE

by Derek Wilson, Director
CSM Academic Computing Center

Change. Expectations. Integration. Workstations. Networks. Diversity. Infrastructure. Distribution. Access. Investment. Evolution. Interaction. Support. Innovation. Ethics. Flexibility. Multimedia. Choice. All words that help to characterize the campus computing environment that is evolving in the 1990s. Notice that few are technical descriptions in the noble tradition of the computer acronym. We could describe the environment with acronyms and technical jargon and we might even be right, but it might read like a science fiction novel and certainly wouldn't cause new users to flock to our doors to learn more.

In 1985, CSM needed to replace its aging academic mainframe and terminal communications system. We had already started to acquire personal computer systems and had upgraded some administrative computing systems. But things weren't fitting together quite right. A growing collection of diverse computer systems and the need to replace the campus mainframe caused us to realize that a set of solutions was needed that would provide a framework to develop strategies, as well as a foundation for growth and investment. Fortunately, technology and opportunity collided, and it allowed us to start developing a campus-wide *computing environment*. This approach was considerably more complex than just replacing an aging mainframe computer system. It demanded more active involvement by computer users in addition to the consideration of issues beyond the purely technical.

Certainly, the technical issues were, and remain, important. Speed, performance, storage, throughput, and power are still evaluated and accounted for when selecting systems. But they no longer reign supreme. Words like access, expectations, integration, network, and flexibility are creeping into the equation. We're finally admitting that people are the key to making it all useful, and issues like ease of use, individual preference, adherence to accepted standards, availability of applications, and personal choice carry equal weight in the computer selection process. Take the people away, and there's no one to use them; turn them away, and they'll choose not to use them or find isolated, partial solutions.

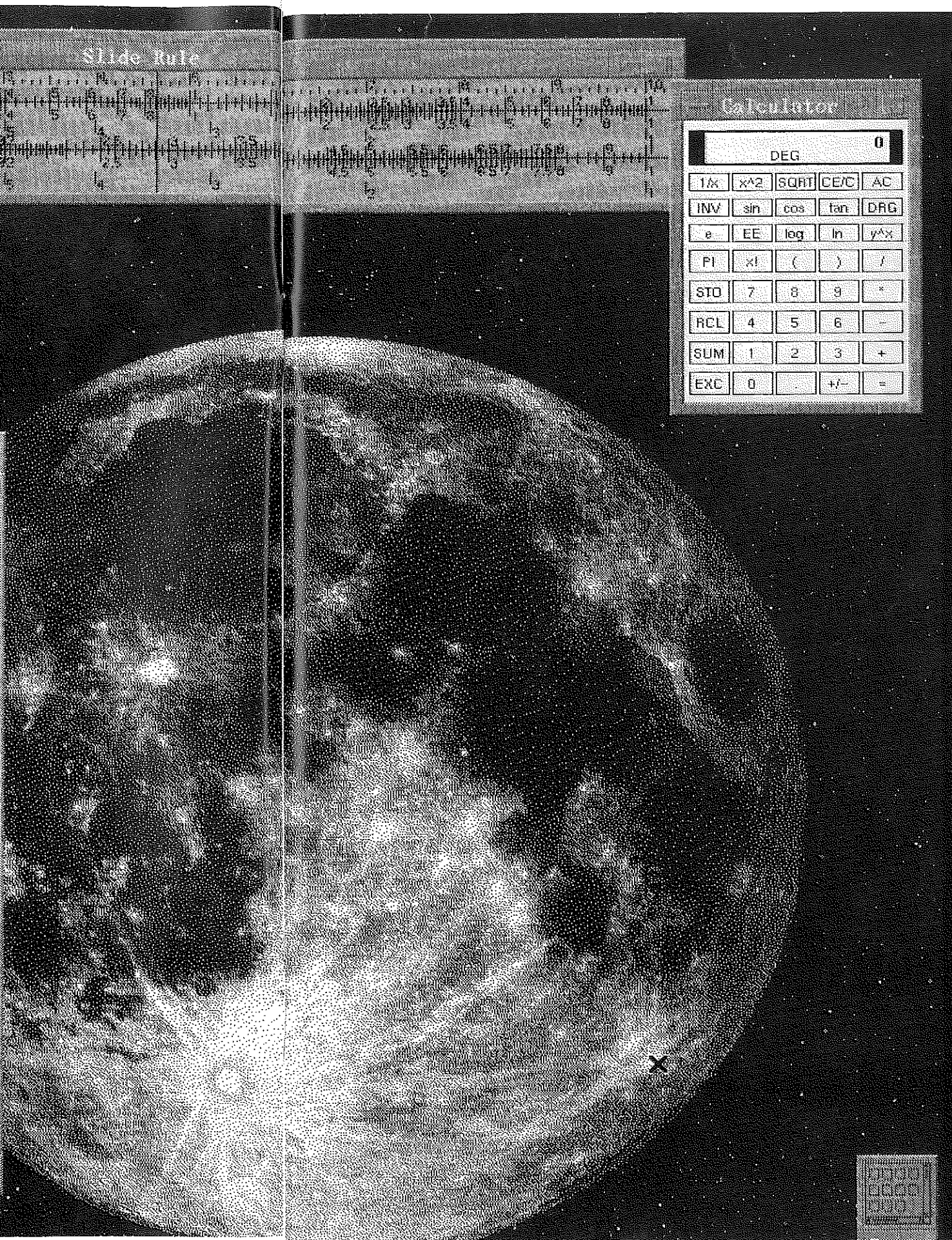
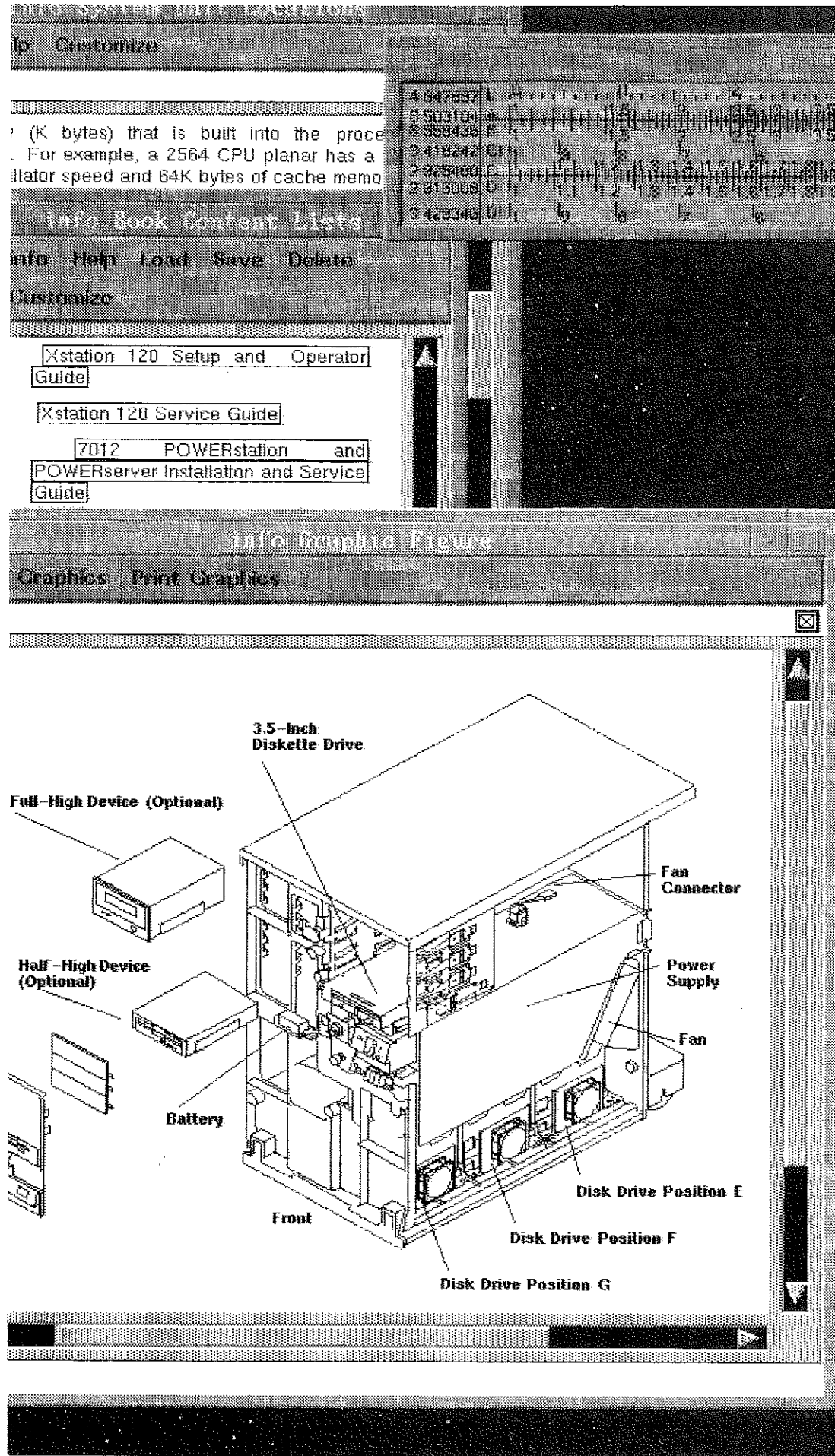
The computing environment at CSM has grown and changed significantly during the past five years. This development has generally been well-received and supported by the campus community; we have fewer resources than most people think we need and more resources than a few think we need. We have discovered along the way that two essen-

tial elements in our computing equation are the *people* are the *environment* in which they want to operate. Defining a future computing environment in terms of today's technology creates the risk of narrowly specifying computing and networking resources. It is better to characterize the environment, identify issues, and suggest directions so that we can be prepared when opportunities present themselves. I have heard this environment described as one that can provide "computing by opportunity."

So what characterizes the campus computing environment that is developing for the future? How should we plan for it and what will the issues be? What has changed and how can we continue to adapt? Some of the characteristics already exist or are being developed at CSM while other ideas require further discussion. Here are some thoughts.

◆ **The computing environment should be "people-centered."** We must fit the environment to the needs of people rather than just training people to work in the environment. While "distributed computing" is a common term used to describe our developing environment, "people-centered" more accurately places the emphasis on the important aspect—the people who use and interact with the computer systems. Creating such an environment involves a variety of issues such as the need for staff to do outreach and provide distributed support, attention to physical work surroundings, and the need to place greater emphasis on the *effectiveness* of the computing environment rather than just the efficiency of specific resources. The technical aspect of the computing environment should, as much as possible, adapt to the changing needs of the people who use it so it will be viewed as an enabling technology. An area of particular importance is that of *expectations*. "Computer people," as we are often affectionately known, have historically mastered the art of turning people away. Raising expectations to new heights and then creating mistrust through the use of excuses, computer jargon, bureaucracy, and poor people skills was, unfortunately, very common. In the computing center of the 1990s, support staff must be as skilled at dealing with people as they are technically capable.

◆ **The community must actively contribute to defining and building the computing environment.** While there will continue to be a coordinating group, such as the computing center, the computing environment will be most successful if it develops and adapts



through the active involvement of faculty, students, and staff. Active involvement is not limited to formal structures like steering committees. The most valuable input often comes from casual conversations in the hallway with students and faculty. The coordinating group must listen, pay attention, sense what the needs of the community are and act upon appropriate input.

◆ **The primary computing tool employed by most academic users in the 1990s will become an advanced-level workstation attached to the campus network.** It will provide significant computing capabilities with a powerful graphical interface and will probably participate in a cooperative computing environment with other departmental and campus resources. Centrally managed computers will primarily perform special tasks required by other computer systems on campus, groups of students and faculty, or the community at large. Specific systems may support broadly required tasks such as campus-wide electronic mail services, specialized applications, disk management, conferencing, and others. Combinations of technologies will allow students and faculty to create innovative approaches to address educational needs and research problems.

◆ **The use of "mainstream" resources can reduce the effects of obsolescence.** Rapidly changing technology creates technical obsolescence quickly. Functional obsolescence can even be more damaging by limiting or preventing our ability to upgrade or enhance computing resources. Furthermore, computer systems that become functionally obsolete lose value quickly, and can be an economic burden. Functional and economic obsolescence can be delayed, and the effects of technological obsolescence can be mitigated, by investing in mainstream resources—those that adhere to well-accepted software and networking directions in higher education and related industries. This allows us to use equipment longer, and effectively "recycle" it for other uses on the campus.

◆ **The campus computing network will become the primary infrastructure related to computing activity on campus.** The

need to access and share resources located both on and off campus will continue to grow, demanding that the campus network be reliable, fast, and well-supported. Computer systems attached to it will have access to a broad range of resources and services and will be able to tap unused capacity in other systems on the network. They will become less useful, like telephones, when parts of the communication network are down. High speed, full function access to the campus network from faculty and student homes will become an issue for many. A whole host of services, including education, training, and operations need to be rethought from the perspective of this people-centered, networked environment. All is not rosy, however, as it raises questions about teaching "responsible" computing behavior, security, ethics, and how major decisions are made. Even with its problems, such an environment fits well within an academic institution, reflecting the way that most people like to work—on resources close to them that they control.

◆ **The campus network will enhance interaction between departments and strengthen interdisciplinary activity.** This is already occurring with the recently established Center for Exploration Geoscience Computing (CEGC). Access to distant resources, and the ability of computer systems and other technology resources to work together will become increasingly important. To strengthen this effort, the computing center and the li-



Derek Wilson

brary have formed an alliance to provide better information about, and access to, nationwide library systems and databases throughout the campus, and to provide improved access to information technology tools from the library. Faculty are already able to communicate with friends and associates throughout the world and many have kept in touch via electronic mail when traveling or on leave in such places as England, Australia, the Netherlands, and Japan.

◆ **"Computing by Opportunity" will become a reality.** Rapidly changing technology, the nature of the computing environment and type of support required, and the use of mainstream resources, all combine to create an environment that permits us to better respond to opportunities that may arise. It allows us to rethink the way we acquire computing and networking resources and form an overall strategy. A simple investment strategy might be to update or replace 20 percent of the resource base annually, providing for a five-year life cycle. In any case, the environment can be built and changed in incremental ways instead of wholesale, and that can help us to manage new technology, staff resources, and funding. It will also help to create a strong infrastructure that can change in evolutionary, rather than revolutionary, ways.

◆ **The type of resources acquired by the school for student use will change—**certainly due to changing technology, but more importantly because of high levels of personal ownership and expertise among new students. About 35 percent of our students own some type of computer today and many entering students have well-developed computing skills. As personal ownership levels grow, the school can focus attention on providing more advanced resources that complement those owned by students. Home computers may be used for utility tasks such as word processing, spreadsheet, and basic graphics applications, while school resources may support advanced programming, modeling, publishing, visualization, and high speed computation requirements.

I have often wondered why the required computer purchase programs at some colleges have never enthused me, given the success stories and excitement they seem to breed. I thought maybe I was just envious of their resource base or the prices they could negotiate. Or even that committing to a technology for four years would limit curriculum potential and insure technological, or even functional obsolescence by graduation. But in discussing the issue the other day with a faculty member, I realized that my real concern has to do with focus. It is easy to focus on technology and forget that the real resources are people—the students and faculty. Technology should enable us, not control us, and when we consider curriculum and technology questions, for example, we should rethink the curriculum from the perspective of how computing and other technologies can improve or change it. By just including computing in the existing curriculum, we run the risk of building the curriculum around the computer resources, and doing that doesn't make much more sense than building it around calculators or slide rules.

Remember when everyone had a slide rule and owning a calculator was a big deal? Not that long ago. Now, I'd be surprised to find a Mines' student who doesn't own a calculator, or who does know how to use a slide rule for that matter.

Everyone seems to have a calculator and owning a computer is a big deal. And they aren't "required". Perhaps we'll be saying the same thing about computers in ten years. At least I hope we will.

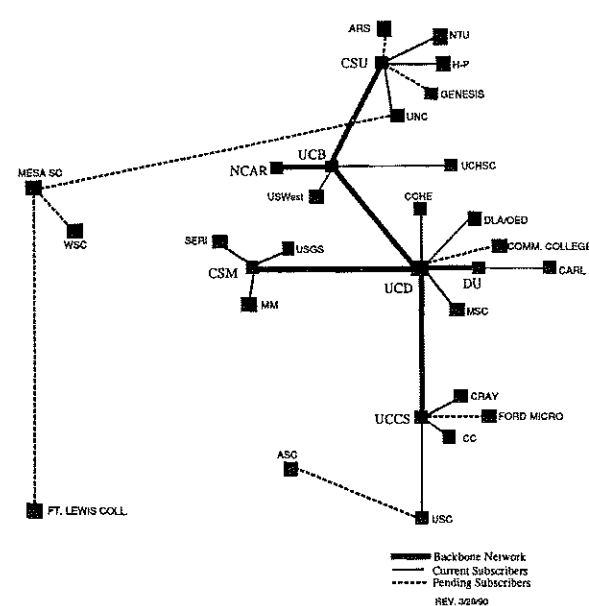
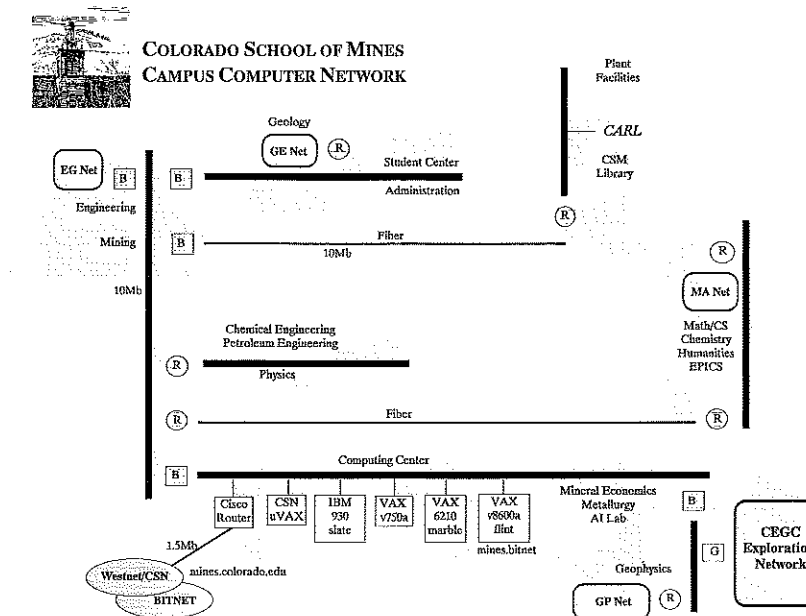
I suspect in ten years I'll be able to read this article and see where some of the cracks in the crystal ball were. Technology will march on and we will continue to be intrigued

by it. Hopefully, we'll plan technology environments around the needs of people, and be driven by words like those found in the first paragraph. If our planning process incorporates vision before viewpoints, and leadership before management, then I think we'll have a chance at being successful. In any case, I hope it doesn't read like an old science fiction novel.

GETTING THERE FROM HERE

Students and faculty at CSM use many different computer systems to support their studies and research. Today, most choose personal computers to write papers using a word processor and do modeling with spreadsheets and scientific graphics software. Sophisticated workstations are becoming both affordable and easy to use and many of these are appearing on campus. Believe it or not, central computers are also still heavily used for many tasks. Keeping all of these computers up-to-date and having enough systems and terminals for students to use is always a problem. Personal computers and terminals are available for general use in student workrooms that are managed by the computing center and a few are also available in the library and dormitories. Most academic departments have personal computers and some terminals and these can usually be used by their students. The campus computer network links most of these resources together so students and faculty can use other computers if needed, move files between computers, exchange electronic mail, and send output to printers and plotters that are located in other buildings, or even down the hall! CSMnet, the Colorado School of Mines campus computer network, is the infrastructure that allows faculty and students to access these resources. This network connects 15 campus buildings with over 100 personal computer systems, workstations, and shared computer systems, and almost 400 terminal and printer lines. As it grows, CSMnet is becoming a network of networks, with departments such as geology, geophysics, metallurgy, mathematics and computer science, and engineering having local networks that attach to the campus network.

Sending electronic mail throughout the world, discussing academic and recreational interests through network news, using supercomputers in distant locations, and browsing through library catalogs and



databases throughout the country are routine activities for many faculty and students. This is made possible through our affiliation with Colorado Supernet, the state computing network. Supernet, with offices housed on the Mines campus, was started in 1986 by six academic institutions, including CSM. As you can see from the map to the left, there are now about thirty members, including academic institutions, government agencies, and corporations.

Colorado Supernet is an integral part of Westnet, the National Science Foundation sponsored mountain states re-

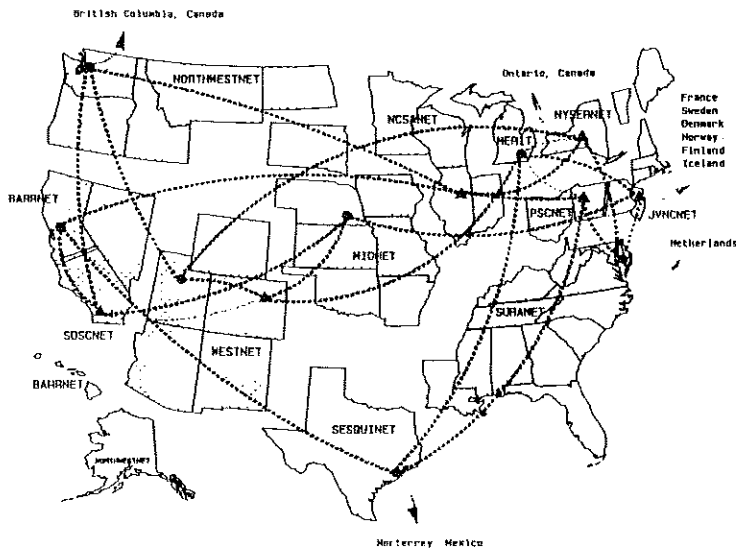
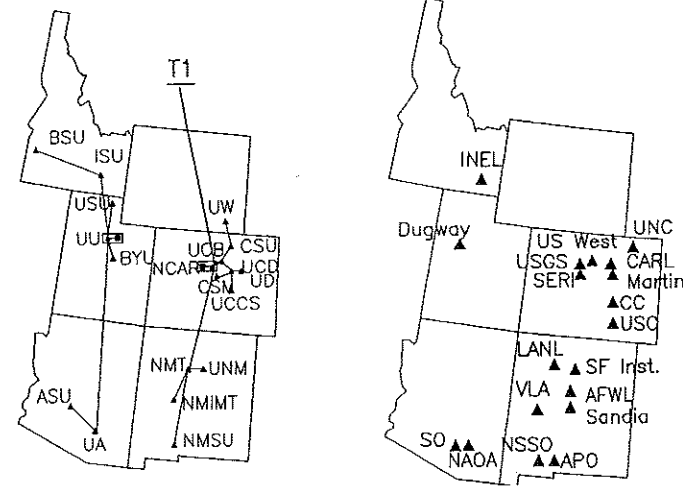
gional computer network. Both of these organizations encourage collaboration between universities and with industry throughout the region. Dr. Robert Cameron, a faculty member in the Mining Department, has used computers at the University of Utah, and others have used supercomputers at NCAR in Boulder and Colorado State University in Fort Collins. Most students and faculty access the CSM Library catalog over the network through the Colorado Alliance of Research Libraries (CARL) computer system.

All major universities in the region and many national laboratories and major companies are part of the Westnet network. Colorado and New Mexico have particularly active participation due to their state computer network organizations. As it grows, so will the opportunities for joint research, education, and technology transfer between higher education institutions and with industry.

The National Science Foundation Network (NSFNET) is a backbone network that connects the many regional networks together as well as six national supercomputer centers. Thousands of computer systems can be accessed from the Mines' campus through this network. Dr. Wendy Harrison and Dr. Richard Wendlandt in the Department of Geology and Geological Engineering has used it to run basin evolution models on a supercomputer in Illinois, and Dave Mayer, a graduate student in petroleum engineering has developed

and run reservoir modeling code for a Connection Machine, a computer with thousands of processing units, located on the east coast. Together with other networks (such as BITNET, MFENET, SPAN, NetNorth, and EARN), the NSFNET and the regional networks create the Internet, an international "network of networks." Dr. Keith Turner kept in touch with the campus through the network when he spent a semester in Holland, and continues to maintain contact with his European colleagues via the network.

Many faculty and students depend on these networks, even though they don't think they are active users. All electronic mail that leaves or arrives at the campus travels across the network, as do the hundreds of news articles that people read everyday. Even though it requires substantial support and cooperation to keep the network running, most people use it without our active involvement or knowledge. The CSM Academic Computing Center staff hears about fascinating uses of the network only when people "can't get there from here!"



Holiday Inn

DENVER WEST

We Welcome CSM Alumni!

As the closest full-service hotel to the school, we offer you . . .

- Our Holidome Indoor Recreation Center (lap-size pool, billiards, saunas, exercise area and more!)
- Free van transportation to the campus! (3.8 miles)
- Our "Dining Deck" Restaurant featuring daily specials and buffets serving Breakfast, Lunch and Dinner.
- Our "Brass Rail Lounge" with "Happy Hour" reduced drink prices, free snacks and live entertainment!

• A very special rate of \$39 single / double (+ tax)

For reservations call (303) 279-7611 • 14707 West Colfax, Golden, Colorado 80401



CEGC UPDATE

Exciting things continue to happen with the development of the Center for Exploration Geoscience Computing (CEGC). The Center, formally unveiled in a joint announcement with IBM in April (*Mines Magazine*, June 1990), received a three-year \$3 million commitment from the W.M. Keck Foundation to endow a permanent visiting chair in the exploration sciences, support facility renovation, and fund program development. Representatives from the foundation, including Chairman and President Howard B. Keck, Directors Marsh A. Cooper and Bob Rawls Dorsey, and Program Officer Sandra A. Glass, visited the campus on June 27. They toured the planned facilities and met with faculty and students to see research activities associated with the center. The first check for \$1 million was presented to Dr. Ansell during the visit.

Dr. Samuel S. Adams, Head of the Department of Geology and Geological Engineering was named director of the center on September 1, succeeding Dr. Phillip R. Romig. Dr. Robert Bruce, Director of Computing in the Geology Department, will be Assistant Director of the CEGC. Dr. Romig continues to be heavily involved with the center and is on the CEGC management committee. In assessing the center's progress to date, Adams said "Under Phil Romig's leadership, the center has achieved its initial objectives—active faculty research programs in several departments, developing curricular changes, initial funding and growing industry interest, collaboration, and credibility. He and Derek Wilson, Director of the Computing Center, have made the Center a force to be reckoned

with and the faculty will take it to new heights in education and research."

Computer equipment recently received includes ten of IBM's most advanced workstation systems, the RS/6000. A prototype facility and network have been installed in Berthoud Hall and is now being used by approximately 50 graduate students and faculty. These systems are the most powerful computers ever to come to campus and have superb graphics capabilities. They are connected in a local network that is attached to the campus network so they can share information with other computer systems and be used by students and faculty from other locations. Approximately 20 more systems are planned over the next two years. These computer systems complement the 16 high-end PS/2 systems that were installed last spring in an education cluster. The cluster is being used during the fall semester for courses in seismic data processing, parallel computing, and engineering geophysics.

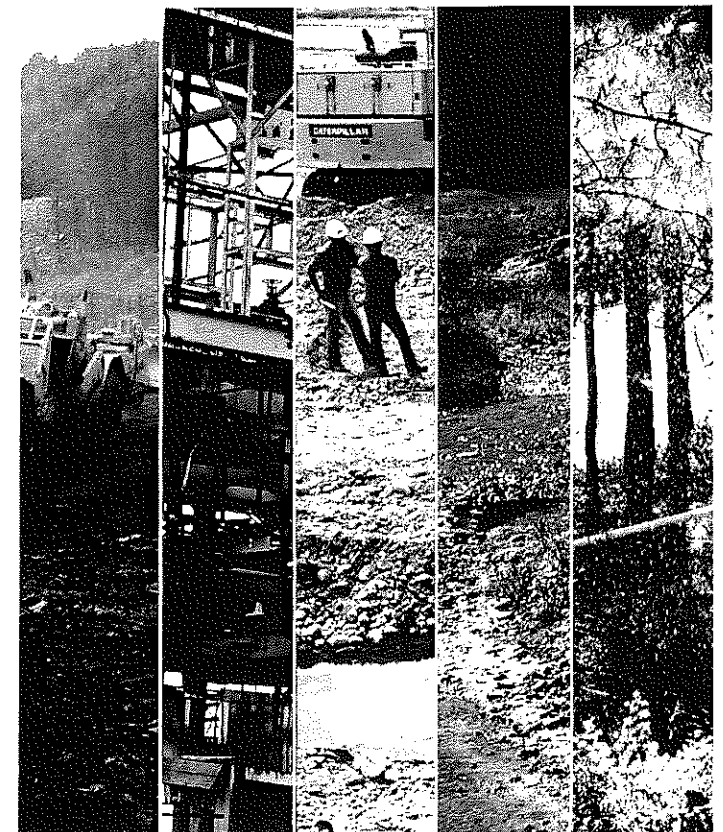
A group of faculty, together with representatives from the Academic Computing Center, and the Plant Facilities Department are working on plans to develop the facility. The CEGC facility is to be located on the second floor of the Green Center in areas currently occupied by the Mineral Economics and Geophysics departments. A lot of logistical issues have to be worked out, including when the Mineral Economics Department will be able to occupy renovated space in Engineering Hall, and where to house other faculty and staff during renovation.

Stay tuned for future articles on center activities and profiles of research and educational initiatives. ▲

SPECIALTY CONTRACTING FOR
RECLAMATION AND DECOMMISSIONING
PROJECTS.

LANDMARK RECLAMATION

One Labor Center 1200 17th Street Suite 2500 Denver, Colorado 80202
303/595-0933



Environmental Enhancement
... Through Quality Reclamation.

COMPUTER SCIENCE EDUCATION AT CSM

by Dr. Jean Bell

Computers are a new technology that has fast become an indispensable tool for most scientists and engineers. Computers are more useful than calculators for computations, more useful than typewriters for word processing, more versatile than drafting for graphics, and they have dozens of other uses as well. Computer modeling allows the user to ask "what if . . ." questions that could never be asked before, since the manual computational time to answer the questions was unthinkable.

So what are we doing at CSM to educate young engineers and scientists in how to use the computer? This article outlines our basic program, as it exists today. Change, however, is inevitable—both in response to changing expectations about students' preparation in high school, and in response to changing technology. Indeed, the EPICS (Engineering Practices Introductory Course Sequence) computing course described in this article is being taught for the very first time in its current format during the Fall 1990 semester. Tune in again in five years, and you'll probably see a very different computer science program at CSM.

Core computer science courses

The "core" courses at CSM are required of all undergraduates. In designing the new core curriculum in computing a host of questions had to be addressed. Some of these questions get to fundamental issues about what kinds of computing skills students will need when they graduate. Questions included:

- ◆ What computing skills will ALL students be required to learn? How much computing should be required?
- ◆ Will scientists and engineers of the 1990's need to know programming, or will computer packages (stress analysis, etc.) be enough?

- ◆ Is learning how to run a package a university-level course, or should students be required to pick it up on their own?
- ◆ If we teach programming, what programming language(s) should we teach?
- ◆ Should computing be taught in separate courses, or integrated into existing subject courses?
- ◆ Should we emphasize computing skills, or teach computer science as a science? What is computer science, anyway?

Our answer to these questions depends, of course, on having a crystal ball about how engineers and scientists will be using computers in the future. Our best guess is that everyone will need, at a minimum, to know the capabilities of computers. Further, most engineers will have to know how to use standard packages and to write programs. By analogy, students are taught calculus not because we think that every engineer will be solving equations eight hours a day, but because engineers must know how to solve the kinds of problems that calculus describes, if the need to solve them arises.

In addition, a computer program is a highly sequential activity. Part of the reason to teach programming is that it forces the student to break down a problem solution into a detailed series of steps. The ability to go from a "word problem" description to a step-by-step solution procedure will be useful to the student in solving everyday engineering and science problems—whether they ever touch a computer keyboard or not.

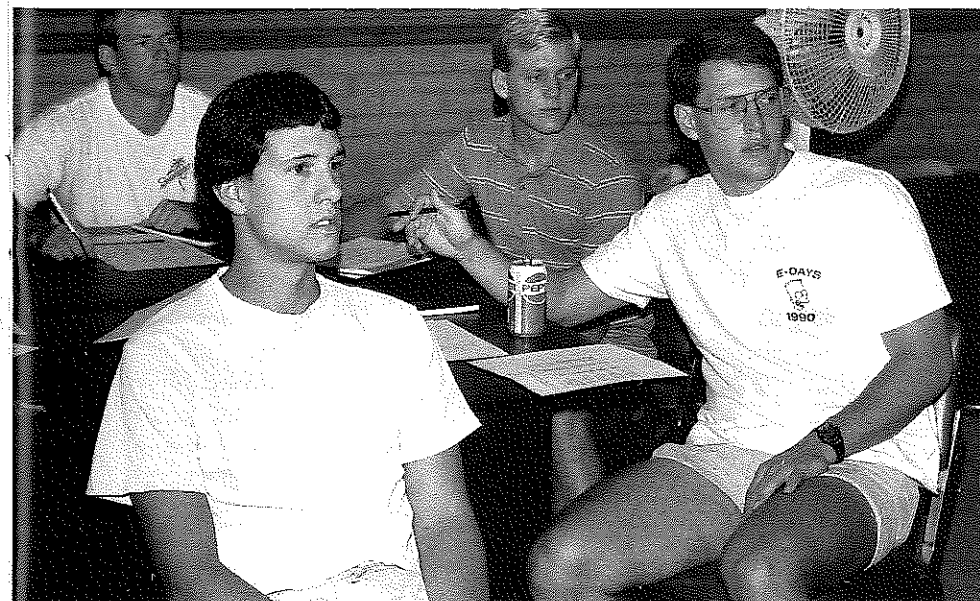
The computing required of all students at CSM is integrated into the four-semester EPICS program at CSM. EPICS is a program that integrates the teaching of many different tools and techniques. (See related story on p. 15.) Two common threads throughout all of the four-semester EPICS se-

quence are an emphasis on problem solving skills, and a semester project for a real engineering client. In computer science, this means that the skills needed to analyze a problem and design a (computer) solution are emphasized. Students begin using their computer problem solving skills immediately in their EPICS projects, and then continue to apply them in many of their other courses at CSM. The goal of the EPICS program is to provide the students with the basic skills that engineers will need, and the model of how to use these skills effectively to solve real problems.

As first semester freshmen, EPICS students concentrate mostly on non-computer skills such as oral and written communication, and three-dimensional visualization. They learn word processing to facilitate professional-quality reports, even for their first projects.

In their second semester, freshmen learn problem-solving using computer packages, with an emphasis on computer graphics. The types of packages we currently teach include spreadsheets, presentation graphics, scientific graphics, and computer-aided design (cad). As with most subjects, the students could learn how to use these packages on their own, but the complexity of the packages justifies including them in a college-level course. Furthermore, the emphasis is on how to apply the concepts, not on the mechanics of the computer package. Use of packages contribute heavily in the solutions to the students' EPICS projects. For example, a recent EPICS project called for the design of a new ramp for handicapped bus riders, and students used computer skills for design and description of the ramp.

In their third semester of EPICS, sophomores learn computer programming skills. Students learn how to develop a computer solution to a problem by giving a very general solution and then decomposing it into very small steps—good training for general problem-solving skills. They then learn how to implement their solutions in a procedural computer language. Currently, we teach the FORTRAN language because it is still the most widely used language among scientists and engineers. Students learn how to run FORTRAN programs on both microcomputers and on larger, centralized computers.



The project in the computer programming EPICS course is to produce a computer package for a client. This year, projects include a computer package for use by chemistry students in chemistry laboratories, and a computer package to graphically display and analyze fluid flows. The students spend the first half of the course understanding the client's requirements and designing a computer package to solve the client's problem. In the second half of the course, they actually write and test the computer code that they will deliver to the client. By the end of the semester, students have a good introductory knowledge of computer programming, and how to build customized computer programs for solving real problems.

In the fourth semester of EPICS, students concentrate on a single large project whose solution hopefully incorporates elements of the diverse skills taught in the first three semesters. By this time also, students have the scientific and mathematical skills to attack very technical problems. The results of several fourth semester EPICS projects are now being used in the "real world" by the industrial clients who work with the EPICS program. This is some confirmation that the integrated style of teaching computing is working as intended—to produce students who not only know their basic skills, but can also apply them to real problems.

Computing throughout the curriculum

Learning computing skills in EPICS is not enough for the students to become truly proficient in computing. Their computing skills need to be reinforced by using computing throughout the curriculum. They use computing to analyze lab data in physics, to design a distillation lab in chemical engineering, or to design a dam in a capstone engineering course. More and more, students use the computing skills learned in EPICS to do ordinary course assignments in their upper division courses. The computer is a tool, a very useful tool for studying science and engineering.

An innovative experiment taking place on the Mines campus is the use of computers to teach calculus. The students run a graphics package, for example, so that they can actually "see" integration as the area under a curve. Or, as another example, they can plot the function they are trying to take the derivative of. These and other experiments will eventually lead to a better curriculum, which takes advantage of the computer as a teaching tool and as a tool for analysis in all sorts of science and engineering activities.

Computer Science — majors and minors

Beyond the introductory computing skills taught in EPICS courses, CSM is now offering a strong program of undergraduate computer science. Students may take these courses as a "minor", consisting of about six courses, or as a math/computer science

major. Math/computer science majors take about eight mathematics courses and about 12 computer science courses. Their strong background in math, science, engineering and computer science make them uniquely qualified for scientific applications of computing. However, their well-rounded computer science background also prepares them for graduate school in computer science or careers related to computer systems.

What is computer science? Unfortunately, it is not a well-defined term—even computer scientists do not agree on precise definition. It is a new science, in which the first degrees were offered less than 30 years ago, and has not yet formed a coherent subject area. It has numerous sub-disciplines, such as language theory and design, database, artificial intelligence. A common theme, however, is the use of step-by-step logic to perform calculations or information management.

All computer science courses at CSM emphasize problem solving, and how to apply computer science concepts to scientific and engineering problems. A wide variety of computer languages are taught, including BASIC, FORTRAN, Pascal, Modula, C, assembly language, and LISP. However, there are no courses that just teach a language. Instead, a language is selected for each course that is appropriate for teaching the concepts related to the topic of the course. For example, LISP is a language used frequently in artificial intelligence, so LISP is taught in the artificial intelligence course. In contrast, C is taught in a course for scientific application programming.

What kinds of courses does an applied computer science program offer? Here is a sampling of our courses, with a valiant attempt to avoid computer "jargon" in their thumbnail descriptions:

- ◆ "Data structures" teaches students how to arrange, or "structure", large quantities of data for easy use during computations.
- ◆ "Software engineering" teaches students how to construct large programming systems or packages.
- ◆ "Machine architecture and assembly language programming" teaches the basic physical components of computer hardware, and how to program them at the lowest level of detail.

- ◆ "Numerical analysis" teaches how to use computers to solve mathematical problems that must be approximated because an exact solution is either too costly or impossible.
- ◆ "Database management" teaches how to arrange data for efficient long-term storage and retrieval. Students do a database project, which is often then used around CSM by real clients.
- ◆ "Artificial intelligence" teaches how to use computers to solve problems requiring human-like decision-making. Machines are "taught" such decision-making by programming them appropriately with rules that describe the decision-making process.
- ◆ "Computer science theory" gives a good theoretical background in the logic and mathematical foundations of computer science.
- ◆ "Operating systems" describes the systems that run the computer hardware itself. Students build a small operating system of the kind that might be used for a computer embedded in a robot.
- ◆ "Graphics" teaches the foundations of computer graphics, for example, techniques for projection of a shape onto a two-dimensional surface.

Into the future

As computer systems become more sophisticated, engineers and scientists will find themselves increasingly dependent on these intriguing tools. At CSM, we try to give all students enough background to be effective users of computers for creating solutions to real problems. All students are taught the capabilities and the limitations of computers, which will be useful to the students even if they never write a single computer program after they graduate. For those students who are particularly interested in computers, we prepare them to be able to create the computer systems of the future, especially the computer packages needed by scientists or engineers. ▲

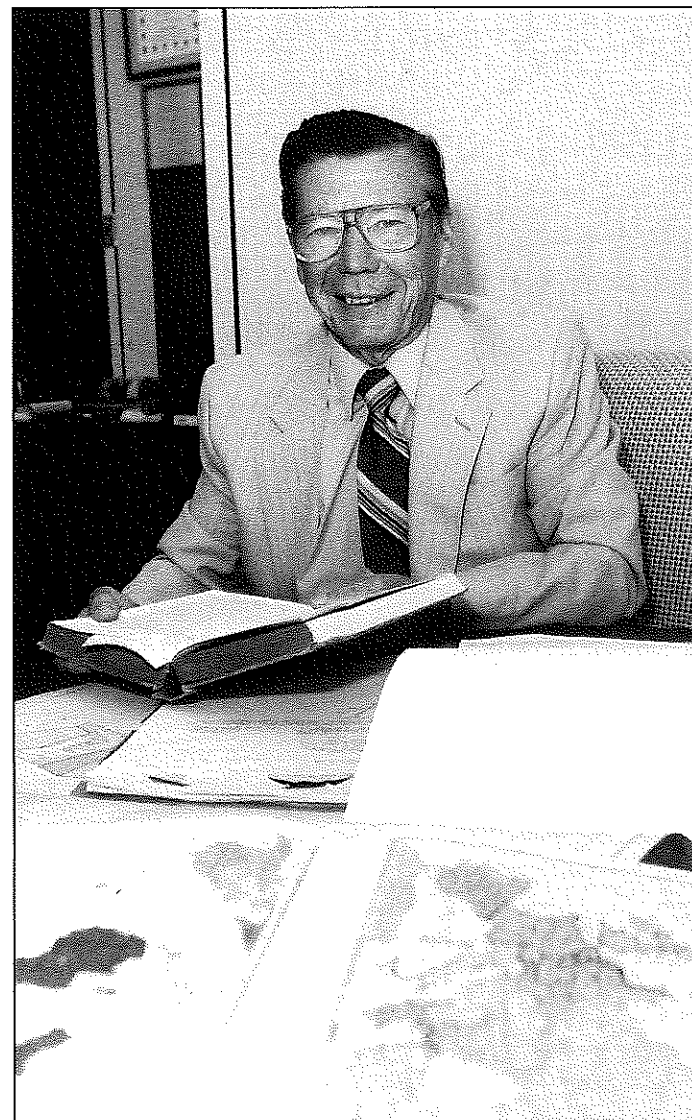
Dr. Jean Bell is an associate professor with Mines' Math and Computer Science Department. Her last contribution to Mines Magazine was February 1989.

Live Entertainment Nightly

- A 500 SF dance floor with special lighting & sound effects.
- Renowned collection of mounted trophy animals.
- Parties catered for groups of 4 to 400.
- Limousine service available.



Buffalo Rose Saloon
12th & Washington St.
Golden, CO
279-5190



Mike Sturk, CALGARY HERALD

To the average American the crisis between Iraq and Kuwait over oil and borders is confusing and distant, but it is very real to a Calgary oilman who once served as senior advisor to the Kuwait government.

Dr. Ian Mackay, DSc. Geol. '53, attributes the Iraqi invasion to greed for Kuwait's oil and cash savings, not claims by Iraq that Kuwait has been producing oil from fields which extend across the two countries. Mackay, who served Kuwait from 1962 to 1968, was responsible for definitive reservoir interpretation and served on the technical committee for border settlements between Kuwait and its neighbors.

Mackay was called back to work on the settlement of the border definition between Kuwait and Saudi Arabia in 1982 and 1983. When he left Kuwait, he took out a copy of what amounts to its title or deed to its territory. Citing historical agreements between Kuwait and its neighbors, Mackay says Kuwait can prove its claims before the United Nations or any court of law.

Kuwait's border with what is now Iraq was defined in the original Anglo-Turkish agreement of 1913, by specific geographical reference points, although the agreement was never formally ratified and the line was not surveyed. The convention between the United Kingdom and Turkey,

CALGARY OILMAN RECALLS SERVICE TO KUWAIT

CALLS RESERVES DISPUTE FEEBLE EXCUSE FOR IRAQI INVASION

by Ellen Glover

respecting the Persian Gulf and Adjacent Territories was signed in London on July 29, 1913, with two articles making specific references to Kuwait territory.

The 1913 boundaries were affirmed again in the Kuwait-Najd Border Convention which was signed at Uqair on December 2, 1922.

Mackay notes this was the first defined border in the entire Arabian Peninsula and existed long before Iraq was carved out of the Ottoman Empire after the first world war, as Britain and France implemented the Sykes-Picot agreement. Britain invited Prince Feisal to the throne of Iraq in order to comply with the Iraqis' demand for a Hashemite king. Even Saudi Arabia did not form its present sovereign state until 1924. Plus, Kuwait was explicitly excluded from the Red Line Agreement of 1928, as it was not considered part of the Ottoman Empire.

The final formal agreements on the Kuwait-Iraq border came through an exchange of letters between the Prime Minister of Iraq and the Ruler of Kuwait, dated July 21 and August 10, 1932, in which the border was reaffirmed in complete agreement with the 1913 convention. In these letters the disputed islands of Warba and Bubiyan were specified as Kuwaiti. This particular negotiation was handled by British representatives on behalf of Kuwait because Kuwait was still under administration by Britain.

In his letter of August 10, 1932 to the Political Agent, Kuwait, the Ruler noted the July 21 letter from His Excellency Nuri Pasha-as-Said, the Iraq Prime Minister, "regarding the Iraq-Koweit frontier." He continued by saying: "We also have noted from the Hon. Political Resident's letter dated July 30, 1932, that the frontier proposed by the Iraq Prime Minister is approved of by His Majesty's Government. And, therefore, we beg to inform you that we agree to reaffirm the existing frontier between Iraq and Kuwait as described in the Iraq Prime Minister's letter."

"It is self-evident that today's events are not the first rape of Kuwait in order to satisfy her greedy neighbors. It is also

cogent to note that if Iraq does not accept the Ugair borders of Kuwait then the Saudi-Iraq border is in equal jeopardy as they all fall under the same agreements," Mackay says with resolve.

In an interview with the *Calgary Herald*, Mackay said when he started going to Kuwait it was an underdog even by Arab standards of impoverishment in the 1960s. "They were fair. I did my job and they looked after me," just as the Kuwaitis have become known as benefactors among fellow Arabs by taking in refugees from their trouble spots such as Palestine and Lebanon.

"If there were ever elections involving all long-term residents of Kuwait, it would start an absolute revolution between all the nationalities as to whom should control the money. It would give Saddam Hussein every opportunity to walk in again. Kuwait belongs to the Kuwaitis. They have been honest custodians of a great wealth which they have managed with great skill, and which has been a benefit to all others who have lived in Kuwait," Mackay reflected.

Mackay wonders if the events in the Middle East are moving in parallel to Hitler's sequential conquests of Austria, Czechoslovakia and the other eastern European nations in the 1930s. He says Saddam Hussein's huge armed forces must be dismantled so he does not pose a threat to surrounding nations.

The flag of tiny Kuwait still flies free in Mackay's down-



Oilweek, August 20, 1990

town Calgary office—a symbol of his deep feelings of duty and love for a country which once hosted him. ▲

NO PLACE LIKE HOME . . .

Editor's note: The following letter was sent to Ginny Mast, curator of the Mines Geology Museum, from Lailla Matthews BSc. Geop. '87, who is now stationed in Saudi Arabia with the U.S. Air Force.

Dear Ginny—

Surprise! I'm in the Middle East trying to save our oil. I never thought my Mines education would wind up in use on this particular aspect of the oil industry.

I'm not exactly having a good time, but I keep telling myself it could be a lot worse. I just hope it doesn't get worse. It's hot and humid and we're all tired of being here and getting pretty homesick (after nearly three weeks). My priorities have really changed—I get excited over things like clean underwear, toilet paper and any bottled water—the rest tastes like it's been drained out of a swimming pool.

We're really packed in here. The base I'm on is designed to hold 700 people and there are over 7,000 (way over) living here. I can't give exact numbers due to security, but I'm not exaggerating this time. Needless to say we have very little personal space and no privacy at all. Eight women share a bathroom and showers with about 80 guys. At least I got practice at this living in the BOII house one summer. There are absolutely no women's restrooms here, so we just ignore the guys at the urinals and use the men's rooms. I think that startles them more than us—they just aren't expecting women to walk in.

Between the work and the diarrhea I keep pretty busy so I don't have to spend hours thinking about how bad it is.

And—I've certainly got to be losing weight! There is plenty of food available, but working 12–14 hours, I can't get to the chow hall too often and the alternative is MREs [prepackaged meals] and I just can't eat them any more, so it's kind of turning into a combination of a prison and a fat farm. There are only two choices, sit in your bunk or get out on the work-release program and work for 12 hours or so and then don't eat. Actually it might work quite well for fat prisoners. There is a tent that shows movies on a TV with a VCR, so actually we have all the comforts of home. Only trouble is the number of people here compared to the number of seats (or standing room for that matter) in the movie tent. Oh, well, really it's **not that bad** (I tell myself to keep repeating that).

When I first got here I kept clicking my heels and saying "There's no place like home," but somebody must have stolen my ruby slippers and it doesn't seem to work with combat boots. Anyway, this doesn't exactly look like the merry ol' land of Oz. So basically I've given up on that and have given in to more conventional means of getting home. I don't think that's going to happen anytime soon.

Anyway—I just thought some people at Mines might be interested to know, I'm back in the oil industry and doing fine so far. If you get a chance to write, my address is:

ILT Lailla Matthews/539-50-6053
Operation Desert Shield
Det 12,25WS Deployed
APO NY 09604.

I could really use the mail—talk someone into writing!

Love, Lailla

At the start of this fall's semester about 25 seniors from CSM gathered in a classroom to begin a new capstone design class. Unlike other senior level classes where everyone in class is from the same discipline, these students had to introduce themselves to one another—they are from four different departments that are participating in projects with local companies and government organizations to solve real engineering design problems.

The students represent a new multi-disciplinary approach to teaching engineering design which will build on the skills they gained through the innovative freshman and sophomore course sequence entitled EPICS (Engineering Practices Introductory Course Sequence).

EPICS combines open-ended problem solving work with instruction and practice in technical oral and written communication, graphics, and computing. After they complete EPICS, students take what have traditionally been standard junior- and senior-level design courses taught in their degree department, but there is some concern on campus that students have not been exposed to the same type of "realism" in their upper division courses, especially in the capstone design sequence.

Dr. Ron Miller of the Chemical Engineering Department, one of the faculty involved in the design sequence, says the course is an option, but is not for everyone. "About 50 students were turned away from the class; our group includes about 25 students from chemical engineering; civil, electrical and mechanical engineering; metallurgical and materials engineering; and physics. We have solicited four very interesting projects which have a cross-disciplinary focus. It's artificial to have a project solved by professionals only in one discipline; in industry you're more likely to have several types of engineers, perhaps an economist and a chemist working on a problem so we felt the senior design sequence should reflect this. Not everyone is best served by a very

DESIGN WITH A PURPOSE

STUDENTS CAP OFF A CAREER

by Ellen Glover

narrow education, especially when industry is seeking multi-talented people," he said.

Miller and Dr. Barbara Olds of the Humanities Department recently sought and received funding from the Department of Education's FIPSE (Fund for the Improvement of Post-Secondary Education) program to fund the capstone program.

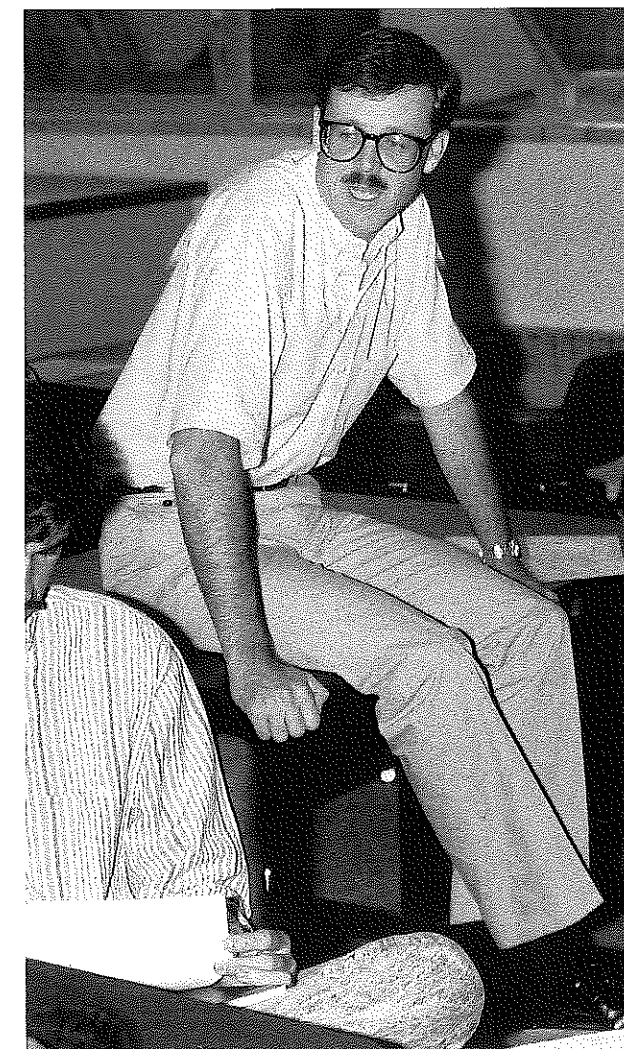
In the new course, students from the different engineering departments will work together as a design team on one of four projects:

- designing and installing computerized test equipment on an engine at the Colorado Institute for Fuels and High Altitude Engine Research (CIFER) located on campus
- working with Coors Ceramics Company to develop a very hard, erosion resistant, and chemically stable optical material used in advanced weapons and aerospace optical systems
- developing an automated microcrystallizer with the National Institute of Science and Technology (National Bureau of Standards) in Boulder
- designing and building a solar electric car with the Solar Energy Research Institute located in Golden which will eventually compete in national races.

Students will be guided by a design management team consisting of the program directors, Miller and Olds and one faculty member from each department. Drs. John Trefny of Physics, Nigel Middleton of Engineering, Robert Knecht of Chemical Engineering, and Bill Copeland and Gerry Martins of Metallurgical and Materials Engineering join Miller and Olds in teaching the course.

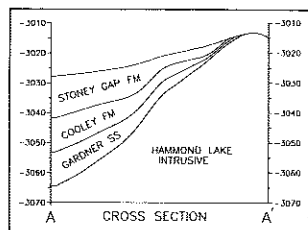
Client benefits are numerous

The clients involved in the capstone course—SERI, CIFER, Coors Ceramics and the National Institute of Science and Technology stand to gain from this program. On the practical side, they will receive a great deal of productive work from some very bright students. Though Drs.

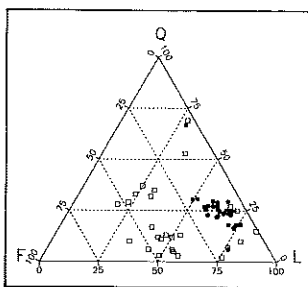


Dr. Ron Miller

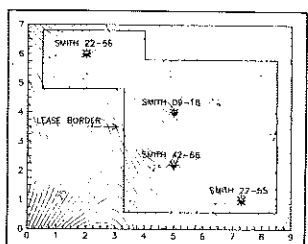
SCIENTIFIC GRAPHICS



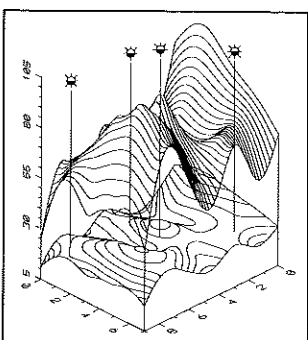
GRAPHER™ accepts your ASCII comma or space delimited file of up to 32000 XY pairs. You may combine an unlimited number of files on each graph. Choose from five types of error bars and six types of best-fit lines. Include automatic legends and unlimited text.



Use any combination of linear and logarithmic axes with automatic or user-specified ticks and labels. Text may contain superscripts, subscripts, and mixed fonts from **GRAPHER**™'s complete symbol library, including Greek letters and special symbols.



SURFER™ creates contour plots from your data quickly and easily. You may specify contour label frequency and format, irregular contour intervals, and data posting. Choose a rectangular border with ticks and labels, or a user-defined shape.



SURFER™ lets you display your data as a 3-D surface in perspective or orthographic projection, rotated and tilted to any degree or angle. Add axes, posting and titles to your plots. Stack surfaces for impressive results.

GRAPHER™ (PC Editor's Choice) . . . \$199
SURFER™ (PC Editor's Choice) . . . \$499
 Demo Disk . . . \$10



FREE Brochure

Go ahead . . . give us a call.
1-800-333-1021
 or (303-279-1021 - fax: 303-279-0909)

GOLDEN SOFTWARE, INC.
 807 14th St., Golden, CO 80401

Purchase orders for IBM-PC are welcome.

Olds and Miller will not guarantee workable solutions, they can, based on their EPICS experience, promise whole-hearted effort and refreshingly creative strategies.

The clients will also benefit from their interactions with both faculty and students. The faculty contacts may lead to collaborative research and certainly should increase mutual understanding and promote discussion between industry and academe. Students view the course as an opportunity to experiment with what they have learned, and to meet prospective employers.

Training versus educating

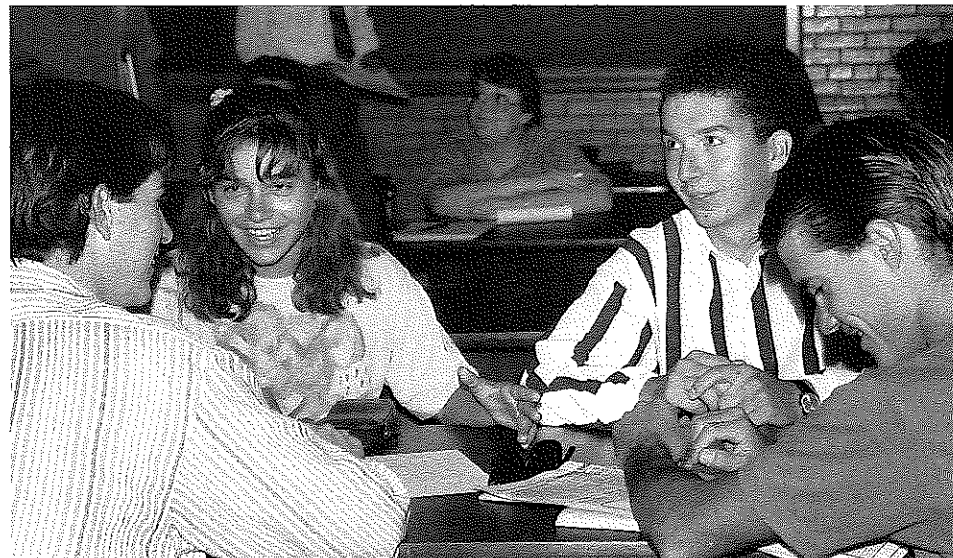
"Throughout our design experience at CSM, we are striving not just to train but to educate our students by having them practice the kinds of integrative, creative thinking they will need to solve the increasingly complex prob-


lems they will face as practicing engineers in the 21st century," Dr. Olds said.

With the established EPICS program and the new senior design sequence, Mines will have a curricular structure that includes some aspect of client-based engineering design throughout the undergraduate curricula.

"We feel our students will graduate with a quality engineering design experience that will help them to understand and appreciate the issues involved in solving complex problems and provide them with the ability to approach such problems with confidence and creativity," concluded Dr. Olds.

If at the end of the year the design sequence proves successful it may be expanded to include geotechnical and exploration projects, involving students from the Geology, Geophysics, Mining and Petroleum Engineering Departments.





Frontier-Kemper Constructors, Inc.
 Heavy Civil & Mining Construction

SHAFT SINKING
 RAISE BORING TUNNELING
 MINE DEVELOPMENT
 GROUND FREEZING

P.O. BOX 6548
 EVANSVILLE, IN 47719-0548
 812-426-2741
 TELEX 27-2141 FAX 812-428-0337

Homecoming

OCTOBER 19, 1990

FUTURE OF LIBRARY LIES IN HIGHER TECHNOLOGY

LIBRARY WITHOUT WALLS

by Ellen Glover

Joanne Lerud, director of the CSM library, has spent her first year on campus evaluating programs, collections, and services inside and outside the library. It's been a challenge, and she says she is convinced that the future of the library lies with strengthening the traditional holdings and with higher technology, a library that encourages and supports preliminary research from home computers and makes the campus facility easier to use.

Mines maintains a fine technical collection of books, journals, maps and government publications, yet the cost of keeping up with all subjects has been a financial strain on past library budgets. The library's visiting committee and a few accreditation boards have said Mines needs to invest more heavily in the library to keep current, a task which escalates rather than declines.

Lerud says a decision was made in the early 1980s to maintain the journal collection at the expense of the book collection; 2,500 current journals and serials titles are available at any time. The average cost of a book in the Mines library is about \$90, and the library director says 20 years from now a visitor to the Mines library will be able to see which years suffered from budget constraints by reviewing the collections, but she says there is some good news in the coming year for the library.

"Mines' administrators have increased our funds from last year, and we have been able to hire a few people to keep up with certain areas like the government maps. Alumni have been supportive of the library, including some reunion classes which have designated their gifts for books or equipment. That's a positive change for us, yet we seriously have to re-examine how well we are serving the walk-in library users as well as those more experienced with our electronic services," she said.

Lerud explained her goals for the library are first, to meet the needs of the students and faculty, and second, to assist the public with like backgrounds—the alumni, government officials, and general public who use the highly technical material found in the library. "Our reference staff must be prepared to handle high-powered questions, more technical than what you would encounter in a neighborhood library. How many city or county libraries handle questions about chemistry or geophysics?" she asked.

Over the next few years, Lerud intends to enhance the library by purchasing books, proceedings and new journals. If funds become available the director would like to hire an archivist to deal with special historical collections housed in the Colorado Room as well as future donations, and upgrade equipment so inquiries are answered quicker.

Pursuing electronic services

If you have visited your local public library recently you've probably searched the catalog by computer. Currently anyone with a computer at home can use the following electronic services at the Mines library:

- CARL (Colorado Alliance of Research Libraries)—you can tap into the Mines library catalog to check a reference, or the catalogs of other major research libraries throughout Colorado.
- Uncover—a current contents database of journal articles.
- U.S. Government Publications database
- Magazine Index and Trade and Industry Index
- Ethernet computer access network to the school's mainframe computer.

Terminals are available in the library as well.

Online searching—the ability to search several hundred subject databases—for students, faculty and all library patrons for a small fee.



Mines library director, Joanne Lerud

(Ellen Glover photo)

Eventually the library will obtain equipment for full document delivery, a boon for the home researcher faced with late night questions or deadlines. You will be able to search a journal for a specific article, review the article and then have it "faxed" to your own printer for a small fee. Lerud says the library staff is working with the Academic Computing Center (see related story) on this technique and other

electronic links to campus. She would also like to see the library obtain compact disk computer equipment which store several times the information on a single disk.

"The library is not static, we do more than check out books," Lerud smiled. "We are trying to keep pace with the specialized curriculum at Mines to best serve students and faculty."

Alumni to become preferred patrons of library

Following a decision by the Colorado School of Mines Alumni Association Board of Directors, active members of the association living in Colorado will be eligible for preferred patron status at the Arthur Lakes Library on the Mines' campus beginning in January 1991. CSMAA active members will be issued a special borrower's card when they show their association membership card to a library staff member.

Patrons of the library who wish check-out privileges may request a special borrower's card. Proper identification with a permanent address in Colorado is necessary for individual membership. Proper corporate identification is necessary for corporate cards.

Annual fees for check-out privileges are:

Individual patron	\$25	
Smaller corporation patron	\$100	4-10 employees
Larger corporation patron	\$500	11-15 employees
Preferred patron	\$1000	16 or more employees who may check out materials

Money collected from patrons is used to maintain the library's resources. All persons may use the library resources without holding a special borrower's card, but must have a special borrower's card to check items out of the library. For information call the association at (303) 273-3295.

DIRECTOR'S DESK

Action Needed To Stop ROTC Unit Closure

by Norman Zehr, Executive Director

In the August issue of *Mines Magazine* you might have read about the possible closure of the Mines ROTC (Reserve Officer Training Corps) unit in 1991.

Since official notice was received by President Ansell from the Department of the Army on July 13 there has been a flurry of activity on campus to attempt to reverse this decision.

Needless to say, events commencing on August 2 with the Iraqi invasion and annexation of Kuwait have changed the world military picture overnight.

In any case, many of us feel that the closure of the Mines ROTC unit would be a mistake, not only for the school but for the US Army and our nation as well.

The school's military history includes the fact that many Mines students served during World War I, specifically in the 115th Engineer Regiment. For that reason the colors of this regiment were entrusted to Mines when that unit was deactivated following the war.

The Mines ROTC unit began in 1919, following World War I, and has been in continuous operation since that time.

Mines has commissioned approximately 2,100 officers into the United States military services. The vast majority went into the US Army Corps of Engineers. Considering that Mines has graduated approximately 16,000 men and women in its history this is a very high percentage. I doubt that any other school, except the military academies, has such a high percentage.

At one time during World War II an army general officer visiting here called the school the "West Point of the Rockies."

The character of the Mines ROTC program reflects the character of the school itself. This is a small institution, focused exclusively on engineering education and of the very highest academic quality. Our program produces self-reliant engineers who possess,

to an outstanding degree, the traits of initiative and loyalty—the type of student the Army should be commissioning.

The school itself has been extremely supportive of the program. This support was strong even during those times in our country's recent history when there was not widespread support of such programs on other college campuses.

The program at Mines is relatively small, and that seems to be what the Army is keying on. In the early 1980s the program fell below the minimum enrollment required but was allowed to continue due to the quality of the commissionees. In recent years it has grown substantially and soon should reach the minimum size requirements, if allowed to continue.

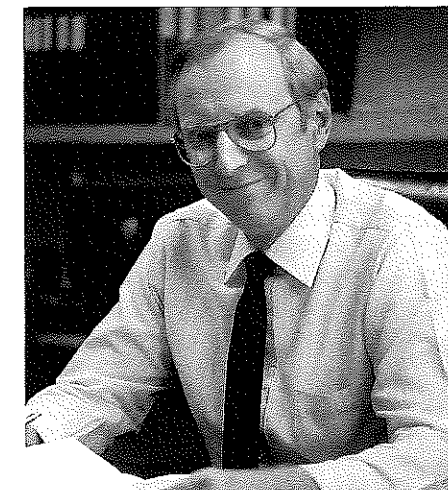
The current enrollment in Mines ROTC is approximately 75 cadets. Many of these are on ROTC scholarships—a tribute to the quality of the program. It is interesting to note that the Army ROTC program at the University of Colorado in Boulder has about 100 cadets (it is not currently scheduled for closure).

Mines ROTC is one of only eight ROTC programs in the nation which are primarily dedicated to the Army Corps of Engineers. Regardless of what the future holds the Army will have a great need for engineer officers. The Corps of Engineers engages in many activities, including civil works, other than purely military operations.

President Ansell has come out strongly in support of retention of the Army ROTC program at Mines.

We ask that any of you who agree that this activity at Mines should not be closed write to:

The Honorable Michael P.W. Stone
Secretary of the Army
Room 3E 718
The Pentagon
Washington, DC 20301-0100



and:

The Honorable Richard B. Cheney
Secretary of Defense
Department of Defense
The Pentagon
Washington, DC 20302-1155

Please send a copy of your letter to me and I will pass it along to the office of Congressman Joel Hefley in Colorado Springs.

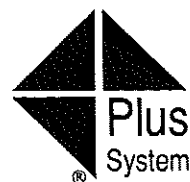
Congressman Hefley has met with President Ansell and other interested parties here on the campus. He has agreed to meet with the Secretaries of Defense and of the Army. He will also work to bring the Colorado Congressional delegation together in a joint effort to support our cause.

Those of you working for major corporations are asked to consider writing on your company stationery for maximum effect.

If you need more information please call me at (303)-273-3296, or Joanne Carr, director of external affairs, at (303)-273-3894. You may also use the toll free numbers—1-(800)-245-1060 (inside Colorado) or 1-(800)-446-9488 (outside Colorado).

It is important that you write immediately. All of us at the school will appreciate your support.

**GOLDEN'S
24-HOUR
CASH ACCESS
BANK**



Drive-Up
Automated
Teller Machine
Located at
19th & Jackson



**COLORADO NATIONAL BANK
GOLDEN**

279-4556
Member FDIC

Geoscientific Software

We are setting the standards for geoscientific data interpretation, processing, and presentation software. Applications are available for:

SEISMIC REFLECTION
SEISMIC REFRACTION
MAGNETICS
GRAVITY
MAGNETOTELLURICS

RESISTIVITY & IP
TRANSIENT EM
FREQUENCY EM
EM CONDUCTIVITY
SLUG & PUMPING TESTS

Call for a **FREE** catalog and **DEMO** program **TODAY!!**

**INTERPEX
LIMITED**

Interpex House
715 14th St.
Golden, CO 80401

Charles H. Stoyer, PhD.
Ronald S. Bell
Steven R. Emch ('82)

tel: (303) 278-9124
FAX: (303) 278-4007

by Mary Jo Giddings, Associate Director, Alumni Services

ALASKA

A big thank you to Steve Enger '81 for volunteering to be our "Alaska Connection". Upon learning that Prof. Bob Thompson '69 and Prof. Ramona Graves '82 of the CSM Petroleum Engineering Department were bringing 25 students to Alaska in June for a summer field session, Steve agreed to arrange a Mines alumni/student get-together.

Working with Mike Kyrias '74, Randy Valencia '89, Steve Lambert '75, Russ Douglass '73 and Tom Walker '89 in Anchorage and Bob Thompson and Norm Zehr in Golden, Steve and his committee coordinated a truly special alumni section event.

Steve writes, "The CSM Alaska alumni picnic held here in Anchorage (at Otter Lake Lodge) on June 6, 1990, was a great success! We had perfect weather in a picturesque setting to enjoy BBQ (catered by "A Taste of Texas") and good fellowship with Mines alums and the 25 PE students in Alaska for their field session. Had approximately 80 attendees (55 alums/families and 25 students)."

Bob Thompson was especially appreciative of all of the Anchorage alumni who provided housing for his students.

We thank Steve and his committee for putting together this fun event and look forward to hearing about more activities from our Alaska section.

HOUSTON

Chuck Russell '54 updated us on their July and August meetings. The July 12th meeting was held at the Town & Country Inn with 21 alumni in attendance. Seventeen alumni attended the August 9 meeting at the Holiday Inn West Loop.

Among the guests joining Chuck at the August meeting were Wally Arnold '53; Bart De Laat '30; Tye De Mass '83; Nancy Dorsey '76; Walt Ellis '63; Jim Hannan '76; Rich Hurt '72; Larry Jones '56; Nancy Keegan '82; Mo Malek-Aslani '50; Jim Murphy '50; Paul Pennington '84; Carlos Rolandelli '89;



Alumni get-together at Ft. Richardson, Alaska.

Garry Schoonover '73; Tim Stouffer '78 and John Turley '65.

For information about Houston's monthly meetings, call 713/726-9477.

DENVER

Instead of a regular meeting, the Denver sections scheduled a get-together on August 25 at the Denver Zephyrs/Iowa Cubs baseball game. Twenty-five alumni and guests enjoyed watching the Zephyrs beat the Cubs 7-2. It was a beautiful evening and Steve Sonnenberg '81, event coordinator, got us excellent seats along the first base line.

Bill '77 and Eileen '78 Colleary were there with their three children and Bill's dad. Young James Colleary came prepared with his baseball glove, but it was Steve Sonnenberg and Helen Coats who really needed it as they scrambled for a foul ball that landed just inches out of their reach.



Enjoying a Zephyr victory are (right to left) Gary Hutchinson '62 with guest Kris Collison, Noelle Sears '86 and guest Wayne Cochran.

Other baseball fans included CSMAA Treasurer Vicki Cowart '77, her husband Chris Hayes and their guests; Southeast Denver Section Coordinator Noelle Sears '86 and guest; Helen and Max Coats '35 (Helen brought homemade cookies for all of us); CSMAA Secretary Gary Hutchinson '62, '89 and guest; Robert Brooks '79 and his family and, from the Alumni office, Mary Jo Giddings and her husband Dave.

If you are a baseball fan, plan on joining us next year.

GRAND JUNCTION

Dr. George Ansell was invited to address the Grand Junction Rotary Club on September 5. Among the guests were a number of alumni from the area including Erling Arnston '52; Neel Beckner '42; Newt Burkhalter '59; Warren Bush '41; S.M. Del Rio '28; Richard

(continued on page 27)

Director of Major Gifts Appointed

Molly Williams, associate director for corporate and foundation relations at Colorado School of Mines Office of Institutional Advancement, has been promoted to director of major gifts.

In her new position, she will be responsible for managing all aspects of major gifts coming to CSM from individual donors.

Williams joined CSM in 1986 and since that time has served as assistant director of development and associate director for corporate and foundation relations. "Molly is a valued member of our development team and I'm delighted she is going to be our director of major gifts," said David L. Powers, vice president for institutional advancement.

She spent five years at the University of Denver in the development office before coming to CSM. She holds a master of science degree from State University of New York (Albany) and a bachelor's degree from State University of New York (Cortland).

Unfortunately some of the names listed on page 18 of the June/July magazine under the 50 year class (1940) were incorrect. The back row should read: Marvin Gantz, James V. Thompson, "Doc" Phelps, P.K. Hurlbut, Fred Nagel, John English, Wm. K. McGlothlin, Logan Caldwell, Lincoln Elkins, Howard Schmuck, Joseph Oberle, Kenneth Lindsay, David Roberts, Steeve Patton, Frank Fisher, Charles Lindberg, William Mueller, Harry Tanaka, Willard Slater and Art Kesling.

Women and minorities fastest-growing segment at Mines

Women and ethnic minority students will make up 37 percent of the new undergraduate student population—freshmen and transfers—at Colorado School of Mines this fall, according to Tim Albers, the school's associate director of admissions. That number represents a five percent increase over last year's enrollment figures. The percentage also reflects an increased number of admission applications received, and students accepted, from both groups for the 1990-91 school year. Total enrollment for the 1990 fall semester is expected to be approximately 2,450 (undergraduate and graduate students), a two percent increase over Fall 1989 enrollment.

Ethnic minorities and women comprise the fastest-growing segment of the CSM population, says Albers. Although women are no longer considered to be a minority in higher education, they still make up a small percentage of students in the engineering, math and science disciplines. The number of incoming ethnic minority and women undergrads at the beginning of each fall semester has shown a significant, steady increase here in recent years. The total was 124 in 1988, climbing to 152 in 1989 and reaching 176 this year, according to admissions office records.

"At the beginning of the last academic year, we sent out a large mailing

to ethnic minority high school students around the country, telling them about the quality education and special programs they'd find at CSM," said Albers. "There has also been a national 'push' in the media and in secondary education in recent years for a greater involvement by women and ethnic minorities in math, science and engineering careers. Mines has been actively recruiting women and ethnic minority students for some time. All of these factors have resulted in a growing number of women and ethnic minority applications and enrollments here."

The school will continue its aggressive recruiting program already in place, with the addition of an effective, informed group of new 'recruiters'—CSM alumni.

"This year, we'll have more alumni involved in recruiting around the nation—about 300 people, compared to around 225 last year. They'll be going to high schools, telling the young people what Mines has to offer—including our high graduation placement rate—and sharing their firsthand work experiences. Their involvement is an exciting, positive force in our recruiting program. It gives potential students a chance to ask questions and get answers from someone who's 'been there.' That's something a catalogue can't provide, and it can make a real difference in enrollment decision," said Albers.

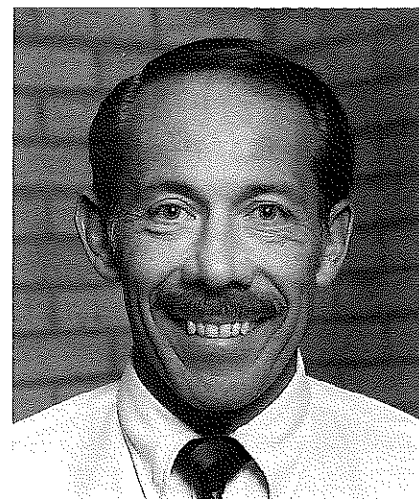
CSM Welcomes Two New Directors

The Office of Institutional Advancement (OIA) at Colorado School of Mines welcomes two new members to its staff this fall.

Jack Fistler becomes OIA's assistant vice president/campaign director in mid-October. Fistler is currently serving as the director of foundation relations at Michigan State University. His capital campaign experience includes the direction of the University of Minnesota's College of Education's \$5 million component campaign (part of an overall campaign of \$300 million), and achieving a successful \$30 million component goal at Michigan State University (part of a \$160 million campaign).

Bernadine Prince joined CSM in September as the school's associate director of major gifts. She comes to the post from the Pennsylvania State University, where she served as consultant to the school's capital campaign coordinator, organizing events and logistics as part of Penn State's major fundraising effort.

Graduate School Welcomes New Dean



Dr. Art Kidnay

Dr. Art Kidnay has been selected as the school's new dean of graduate studies and research. A faculty member at CSM for 21 years, Kidnay has served as head of the Department of Chemical Engineering and Petroleum Refining for the last eight years. His post there has been assumed by Dr. Bob Baldwin, a faculty member since 1975.

During his years as department head, Kidnay led the department to a position of prominence in both graduate and undergraduate education, and its research programs have become among the best in the field under his direction.

Baldwin has received the Amoco Outstanding Teacher Award, the Burlington Northern Distinguished Faculty Member Award and the Outstanding CEPR Faculty Member Award. He has also served in the school's McBride Honors Program and as associate dean of engineering and undergraduate studies.

"Dr. Kidnay has solid plans for furthering the development and quality growth of the graduate school," said CSM's Vice President for Academic Affairs Frank Schowengerdt. "I have high hopes for the future of our graduate and research programs, and I look forward to working with him."

CSMAA PRESIDENT RECEIVES ENGINEERING AWARD



Professor Jim Johnstone

"As just one of the organizations touched by Prof. Jim Johnstone, the Professional Engineers of Colorado are deeply indebted to the unselfish commitment Jim has made to our society and have recognized his efforts with the highest award that can be given, the Alfred J. Ryan Meritorious Service Award. The award represents a heartfelt thanks from an organization that has benefitted greatly from Jim's untiring service, friendly guidance and dedicated leadership."

With that statement the Professional Engineers of Colorado (PEC) presented Prof. Jim Johnstone with the Alfred J. Ryan Meritorious Service Award, at the annual PEC meeting held in Pueblo, Colorado this past June. Johnstone received this award for his outstanding contributions to the engineering profession and the public welfare through his many years of involvement in industry, as a professor at the Colorado School of Mines, and as a member of numerous professional organizations. "He has given unselfishly of his time and energy to promote the social, professional and ethical interests of the engineer as well as the growth of the engineering profession within Colorado," according to the PEC.

As a member of many professional organizations, Johnstone has made a notable impact in the state and nation. He has participated at all levels of leadership within the Professional Engineers of Colorado since 1955 and has helped to organize six of the nine chapters within the state. As a member of the National Society of Professional Engineers (NSPE), Jim served as national director, national vice president and southwest regional vice chairman of professional engineers in education. As a member of NSPE, Jim contributed to a number of notable national committees including ethics and the Board of Ethical Review. Jim is also a member of the American Society of Engineering Education, the American Society of Civil Engineers, American Arbitration Association, the Association of Independent Colleges and Schools, National Council of Engineering Examiners and has served on the National Board of Governors for the Order of the Engineer.

Geostat Systems International, Inc.

- ORE RESERVES AROUND THE WORLD -

GSII is a leader in software and consulting for the minerals industry. The consulting group has evaluated over 300 deposits and is renowned for superior software that produces accurate, timely results. Geostat offers Geostatistical Short Courses in English and Spanish. We can offer courses and seminars tailored to meet your company's needs.

- SOFTWARE LIBRARY
- CONSULTING SERVICES
- BANKABLE STATEMENTS
- TRAINING

GEOSTAT SYSTEMS INTERNATIONAL, INC.
P.O. Box 1193 - 2221 East Street
Golden, Colorado 80402
TEL: (303)277-0070 FAX: (303)278-4749

Blue Key nears goal of rebuilding "M"

Mines' Blue Key Club is close to completing its goal of stabilizing and rewiring the "M" on Mount Zion, a project which will totally renovate the electrical system and insure that the whitewashed rocks will stay in place. The cost of the project upon completion will be approximately \$15,000.

The project has captured the spirit of Mines students who have worked hard to raise funds, haul materials and carefully rework the massive emblem. During the recent freshmen orientation Blue Key Club members wrapped the bulbs in plastic wrap to prevent the many gallons of whitewash from covering bulbs, conduits and their hard work.

For \$32 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. The project has been popular with alumni who have purchased more than 200 bulbs, and some of their letters are reprinted here to show their enthusiasm. About 345 bulbs remain to be sold.

Buy your bulb now for birthdays, reunions, Christmas or other holidays—a great gift idea! Buy one more bulb for \$32 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.

Dear Connie,

Enclosed is \$32 for the lightbulb. I always wanted my name in lights.

Best regards,
Cecil Craft, Geop. E. '57
Larkspur, Colorado

Dear Connie:

The lighting of the "M" brings back fond memories. In 1925 I was a freshman at the Colorado School of Mines and helped paint the "M" so it is only natural that I want to see it well lighted.

Enclosed is a check for two bulbs.

Sincerely,
Buzz Davis
Class of 1929
Cheyenne, Wyoming

Dear Connie,

Here's a check for a bulb. It looks like you folks are moving into the modern era with the classy looking lighting system, and it even looks like the bulbs will have some protection. Wish I could be there.

Sincerely,
John Tower, P.E. '35
Dallas, Texas

Dear Connie,

If you have one left, name a bulb for me. I don't often have the opportunity to visit Golden, but over the years I have changed planes at the Denver airport many times, traveling from and to California. Often, when leaving to the west at night, the flight path takes the aircraft just north of the lighted "M". Seeing it always brings back fond memories of Mines.

I, like all freshmen and seniors of our day, made the two traditional climbs to replace the bulbs and whitewash the letter. In addition, as a pledge, I spent a few cold nights on the transit, watching the "M", to make sure it was not attacked by whomsoever was the football opponent for the week.

Respectfully,
Joe Sullivan, Geol. E. '51
Sacramento, California

Dear Ms. Casey,

Enclosed please find a check for \$32 to buy one bulb for the "M" renovation. As a Blue Key member from the class of 1985, I have spent a lot of time replacing bulbs and performing miscellaneous amateur electrical work on the "M". I am very happy to see that the "M" is finally receiving the renovation it deserves.

Good luck, and have lots of fun—tending to Blue Key's prize responsibility!

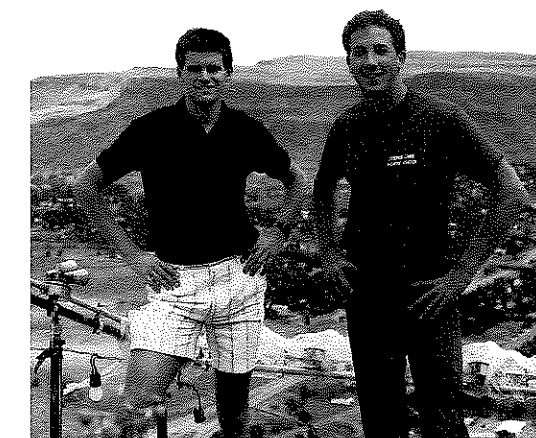
Sincerely,
Carla A. Grano, BSc. Pet. '85
Washington, D.C.

Dear Ms. Casey,

Enclosed you will find \$32 to purchase a bulb for the "M". Rebuilding the "M" is a wonderful project for Blue Key. I was impressed by the innovative method of financing the project.

I am a graduate of Mines (Geop. E. '63) and was initiated into Blue Key in 1961. It is encouraging to see that Blue Key is still serving Mines.

Sincerely yours,
August J. Zarcone
Downers Grove, Illinois



Blue Key members Jeff Duvall and Mike Todd at the "M."

As part of their new student orientation program, freshmen participated in the annual "M-Climb" on August 23. In keeping with the long-standing Mines tradition, the students carried 10-pound boulders and ample quantities of whitewash up Mount Zion, placed their rocks on the "M", then covered the emblem—and themselves—with a fresh coat of whitewash.

The School of Mines "M"-blem is the largest electronically-lit school emblem in the world.



Amoco helps minority students get one step ahead

A \$16,000 donation from the Amoco Production Company gave 11 Colorado School of Mines minority freshman the chance to get their college careers off to a successful start this summer.

The students were taking part in the pilot Summer Bridge Program, a joint effort between Amoco and the school's Minority Engineering Program (MEP), where they took introductory chemistry and math classes to prepare them for the rigors of their Mines' studies. The students selected for the program were among those with relatively low scores in algebra, trigonometry or chemistry on the school's Quick Start placement tests.

"They're all good students, but they realized that their scores in these areas indicated a need for additional instruction," said MEP coordinator Don Velasquez. "They would have to take these introductory courses in their first year here, anyway. By taking them in the summer before their freshman year, they're one step ahead." The pilot program has proved to be a success, according to Velasquez, and plans are already being made for next summer's effort, and beyond.

"Amoco is happy to assist CSM's Minority Engineering Program," said E.D. Newman, vice president of the company's Denver region. "The school has traditionally been an excellent training ground for current Amoco employees, as well as for the participants in our summer intern program. We want to help continue CSM's efforts to provide a quality educational experience for all of its students."



CSM Profs Honored by GSA

Two Colorado School of Mines faculty will have papers presented at the 1990 Geological Society of America's annual meeting in Dallas, Texas, in October.

Kenneth E. Kolm of the school's geological engineering department, will have "Developing Regional Ground-

Water Models for the High-Level Nuclear Waste Repository, Yucca Mountain" presented at the meeting. Kolm has been a faculty member at CSM since 1983, and served as director of the school's Institute for Ground-Water Research and Education from 1986-88. He was the recipient of the Amoco Outstanding Teaching Award in 1985.

"Drainage from Coal Mines; Chemistry and Environmental Problems" by **Thomas R. Wildeman**, of CSM's chemistry department, will also be presented

at the event. Wildeman has been a faculty member at CSM since 1967. He recently earned recognition from the American Consulting Engineers Council for his 'environmental solutions' work in using a man-made swamp, or wetlands, to keep acid and heavy metal mining waste from flowing into nearby Clear Creek near Idaho Springs, Colorado.



HAZEN'S SOLUTIONS WORK

Hazen Research provides practical solutions for your chemical and mineral processing problems.

- *Process Development*
- *Pilot Plant Design—Equipment—Operation*
- *Analytical, Mineralogical and Geological Services*
- *Plant Operation—Consultants*

To put Hazen to work for you contact:



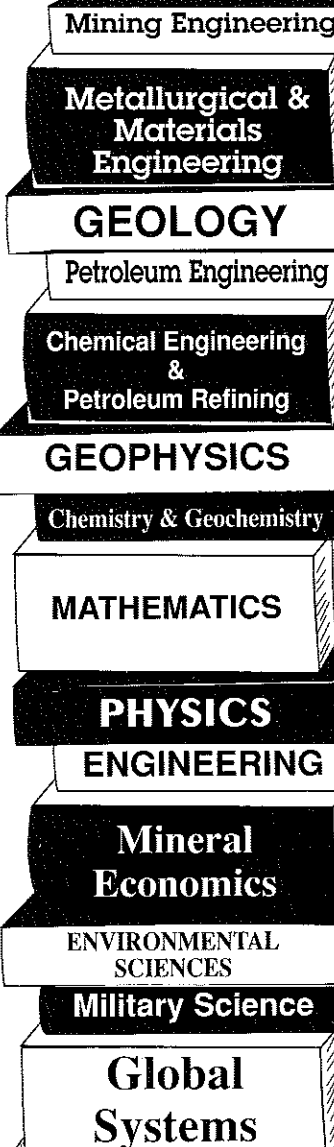
Hazen Research, Inc.
4601 Indiana Street
Golden, Colorado 80403
FAX: 303/278-1528
303/279-4501

COLORADO SCHOOL OF MINES ALUMNI FOUNDATION, INC. Combined Balance Sheet June 30, 1990 and 1989

	General Operating Fund	Student Loan Funds	Endowment Fund	Mines Alumni Fund	1990 Total All Funds	1989 Total All Funds
ASSETS						
Cash	\$ 66,168	\$126,435	\$ 1,845	\$(34,714)	\$159,734	\$187,426
Investments (Note 1)	60,000	0	294,296	0	354,296	261,198
Interest Receivable	843	0	351	0	1,194	0
Accounts Receivable	5,022	0	0	47,431	52,453	1,815
Student Loans Receivable (Note 1)	0	215,437	0	0	215,437	214,300
Loan to Blue Key	3,714	0	0	0	3,714	55,485
Due From Other Funds	0	0	0	0	0	4,228
Inventories (Note 1)	5,214	0	0	0	5,214	7,519
Equipment (Notes 1 & 4)	2,830	0	0	0	2,830	4,279
Total Assets	\$143,791	\$341,872	\$296,492	\$ 12,717	\$794,872	\$736,250
LIABILITIES AND FUND BALANCES						
Payables	\$1,055	\$29	\$0	\$0	\$1,084	\$1,353
Due to Other Funds	0	0	0	0	0	4,228
Leases Payable	0	0	0	0	0	0
Other Liabilities (Note 5)	1,338	0	0	0	1,338	1,338
Total Liabilities	\$2,393	\$29	\$0	\$0	\$2,422	\$6,919
FUND BALANCES						
Restricted	\$ 0	\$268,952	\$179,047	\$12,717	\$460,716	\$430,540
Unrestricted	141,398	72,891	117,445	0	331,734	298,791
Total Fund Balances	\$141,398	\$341,843	\$296,492	\$12,717	\$792,450	\$729,331
Total Liabilities and Fund Balances	\$143,791	\$341,872	\$296,492	\$12,717	\$794,872	\$736,250

TECHBASE

Engineering Software for Solving Real World Problems



The TECHBASE database management system provides a comprehensive set of sophisticated tools for a broad range of engineering, geological, and scientific applications. This tool kit approach to problem solving incorporates statistics, graphics, modeling, mine design, and geostatistics capabilities with a DBMS featuring unlimited storage capacity.

TECHBASE is compatible with industry standard PCs, workstations, and peripherals. Call or write today for more information.

Now Available on the MAC!
Dealer inquiries welcome.

MINEsoft, Ltd.
1801 Broadway, Suite 910
Denver, CO 80202-3837
Phone (303) 292-6449
FAX: (303) 298-7351
TELEX: 981868

LETTERS

Dear Ellen,

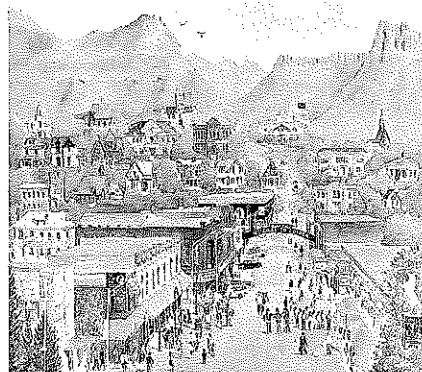
It was good to make your acquaintance at the recent Mines graduation ceremonies. And as a family we want to thank you for the great article you wrote on the Elkins tribe. It will be added to the scrapbook for the archives you may be sure.

Thank you too for retuning the scrapbook page which we sent you, as you may guess it is valued by the family, so it is good to have it safely back in its place.

The picture you sent is good, and we are so happy to have that too. So for your many favors and kindnesses we do thank you so much.

Hoping to see you again soon.

Sincerely,
Lloyd and Virginia Elkins



GOLDEN A VISIT DOWNTOWN

• ORDER FORM •

_____ posters
(25" x 26") @ \$20 \$ _____
Postage and handling \$ 5.00
Name _____

Address _____
City _____
State _____ Zip _____
Telephone _____
Colorado residents add \$1.24 sales tax
per poster. Total \$ _____

Mail to: CSMAA
P.O. Box 1410 • Golden, CO 80402



Kappes, Cassidy & Associates

Specialists in the Testing
and Field Application of
Heap Leach and Cyanide Technology

Since 1972

1845 Glendale Avenue
Sparks, Nevada 89431
Phone (702) 356-7107
Telex 170049
Fax (702) 356-5609

Dan Kappes, '66
W. Robert Rose, '81
Richard Ellwanger, '70

*Thank You
for Choosing
Marriott.*

DENVER Marriott
WEST

1717 Denver West Marriott Blvd. • Golden, CO 80401
(303) 279-9100

Homecoming

OCTOBER 19, 1990

Sections

Governor Roy Romer shared his concerns on education and the economy with the 51 alumni and guests who attended the Downtown Denver Section breakfast meeting held at the Petroleum Club on September 10. The meeting was coordinated by Roger Hutson '82 and Claudia Rebne '84.

Photo by Ellen Glover



(continued from page 20)

Dewey '43; John Emerson '38; Russ Gillis '82; Joe Hopkins, Assoc. '37; Jack Jones '40; Owen Kingman '42; Bob Sayre '34; Kay and Tony Setter '32 and Frank Woodard '42.

Also enjoying the luncheon were CSM staff members Joanne Carr and Nurdy Jensen and, from the Alumni office, Norm Zehr.

WHILE ON THE ROAD . . .

Enjoyed the postcard we recently received from Phil Cloues (E.M. '66; M.E. '71) dated July 4, 1990. Phil wrote "I just met Richard Kemp (Geop. '65) over dinner at the Nallaquick Hotel in Kotzebue, Alaska, so I guess this is the farthest north CSM alumni meeting on the 4th of July! He and I were both wearing CSM shirts and had never met before today. Small world to be wearing Oredigger shirts 25 and 24 years after graduation. Thought you'd appreciate this fact." We did, Phil. Thanks for writing!

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

CRUSON AND PANSZE GEOLOGISTS

- Precious Metals
- Mineral Exploration
- Property Evaluation

1019 8th Street
Suite 300
Golden, Colorado 80401

Phone: (303) 279-0172
Fax: (303) 278-3461

TECHBASE

Engineering Software for Solving
Real World Problems

Let Diane Grant Tell You About the TECHBASE Database Management System

"TECHBASE fulfills a number of functions for our group, including the efficient exchange of data with regional offices and the generation of maps by geologists while in the field.

"We have been able to store, update and exchange data with several regional offices internationally. This TECHBASE network encompasses nearly 60 professionals in a dozen offices throughout the United States, Canada, Africa, and Asia.

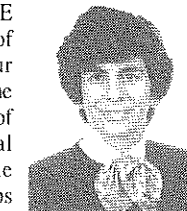
"The majority of our map-making functions are done by our geologists using lap top computers in the field. We are currently using the system on about 50% of our projects, with map generation as the key function. With the release of TECHBASE Version 2.02, our system will include more geology, including display patterns and downhole geologic interpretations," — Diane Grant, Manager of Exploration Computer Services, BHP Utah International, Inc., San Francisco, CA.

The TECHBASE database management system provides a comprehensive set of sophisticated tools for a broad range of engineering, geological, and scientific applications. This tool kit approach to problem solving incorporates statistics, graphics, modeling, mine design, and geostatistics capabilities with a DBMS featuring unlimited storage capacity.

TECHBASE is compatible with industry standard PCs, workstations, and peripherals. Call or write today for more information.

*Now Available on the MAC!
Dealer inquiries welcome.*

MINEsoft, Ltd.
1801 Broadway, Suite 910
Denver, CO 80202-3837
Phone (303) 292-6449
FAX: (303) 298-7351
TELEX: 981868



*Diane Grant,
Manager of
Exploration
Computer Services,
BHP Utah
International, Inc.,
San Francisco, CA*

CSM hardwood captain's chair with satiny black lacquer finish, cherry arm rests, and trim, and hand-stencilled school logo in gold, \$225.



CSMAA ORDER FORM

ORDERED BY: _____ SHIP TO: _____
 Name _____ Name _____
 Address _____ Address _____
 City _____ City _____
 State _____ Zip _____ State _____ Zip _____
 Telephone _____

Gift card should read to: _____
 from: _____

Description:	Quantity	Unit Price	Total
CSM hardwood captain's chair			
Total for Merchandise			
Sales Tax: Colorado Residents add 6.2%			
Shipping, handling and insurance			
TOTAL			

Allow 2-3 weeks delivery. Include your telephone on order blank to receive delivery instructions. UPS shipping charges will be billed to you upon delivery of the chair.

CALENDAR

October 9

OKLAHOMA CITY ALUMNI — BREAKFAST MEETING, Fifth Season Inn 7:00 a.m.; for information contact Greg Staff (BSc. CPR '73), 405/848-9750.

October 9

DOWNTOWN DENVER ALUMNI — BREAKFAST MEETING, The Petroleum Club, 555 17th Street; 7:00 a.m.; \$10:00. Speaker: Tom Petrie of Petrie, Parkman & Company. Topic: "Implications of Current Gulf Crisis for U.S. Petroleum Economics"; reservations required. RSVP Alumni Office 303/273-3290; Roger Hutson (BSc. Geol. '82) 303/292-2322; or Claudia Rebne (BSc. Geop. '84; MSc. Geop. '86) 303/298-2344.

October 10

DENVER WEST ALUMNI — BREAKFAST MEETING, Sheraton Hotel, 360 Union Boulevard. Breakfast buffet 6:30 a.m.; program 7:00 a.m.; \$8.00. Speaker: Fritz Brennecke, retired CSM athletic director. For information call Section Coordinator Dan Witkowsky, (Met. E. '66) 303/236-5202.

October 19

CSMAA BOARD OF DIRECTORS MEETING, Golden. Middleton Room in the Ben Parker Student Center; 8:00 a.m.

October 20

HOMECOMING, Golden. 1:00 p.m. MINES vs. Chadron State (Nebraska). Tailgate picnic after parade; Steinhauer Field House dedication and alumni reception after game.

October 27

"GEOSCIENCES CAREER FAIR"—Teacher's Orientation. The purpose of this meeting is to inform all science teachers about the geoscience career opportunities available to young students (7-12th grade). For information contact Marsha Barber, 303/273-3303 (afternoons only).

November 15

SOUTHEAST DENVER ALUMNI. Speaker: Dr. Frank Schowengerdt, CSM vice president of academic affairs. Call Section Coordinator Noelle Sears (BSc. Eng. '86) 303/779-0576; Hilton South, 11:30 a.m.

November 9

ALUMNI NIGHT WITH THE COLORADO SYMPHONY at Boettcher Concert Hall, 6:30 p.m.; concert followed by buffet dinner; call alumni office for details.

December 2-3

ANNUAL MEETING OF THE ARIZONA CONFERENCE OF AIME, will be held at the Doubletree Hotel, Tucson, Arizona. For more information contact the Meetings Dept., Society for Mining, Metallurgy, and Exploration, Inc., P.O. Box 625002, Littleton, CO 80162-5002, or call 303/973-9550.

December 3

TUCSON ALUMNI, A 12:15 luncheon in conjunction with Arizona Conference of AIME; social hour at 11:30; for reservations/information call Gordon Wieduwilt (Geop. E '53) at 602/326-8619.

December 4

DENVER SECTION HOLIDAY PARTY, Denver Athletic Club. Speaker: Marv Kay (E.M. '63), CSM Head Football coach, assistant athletic director, Mayor of Golden. Cash bar 11:15 a.m.; lunch 12:00; RSVP Alumni Office.

December 5-7

NORTHWEST MINING ASSOCIATION CONVENTION, Sheraton-Spokane, Washington. Alumni Breakfast **Friday December 7**, 7:00 a.m.

December 13

CSMAA BANQUET FOR GRADUATING SENIORS, Green Center. Social Hour, 6 p.m.; Dinner, 7 p.m.

1991

January 9

DENVER WEST ALUMNI — BREAKFAST MEETING, Sheraton Hotel, 360 Union Boulevard. Breakfast buffet 6:30 a.m.; program 7:00 a.m.; \$8.00. Speaker: Dr. George Krauss, director of CSM Advance Steel Processing and Research Center; for information call Section Coordinator Dan Witkowsky, (Met. E. '66), 303/236-5202.

February 2

"GEOSCIENCES CAREER FAIR"—for 7-12th grade students and their science teachers, to be held on the CSM campus. For more information contact Marsha Barber 303/273-3303 (afternoons only).

February 27

CSMAA ANNUAL MEETING in conjunction with **CSM/SME ANNUAL MEETING AND EXHIBIT**—Denver/ Hyatt Regency; alumni breakfast 7:30 a.m.; RSVP 303/273-3290 by 2/25.

April 10

DENVER WEST ALUMNI — BREAKFAST MEETING, Sheraton Hotel, 360 Union Boulevard. Breakfast buffet 6:30 a.m.; program 7:00 a.m.; \$8.00. Speaker: Dr. Eul-Soo Pang, head of Global Systems and Cultures Department and Director of CSM International Institute; for information call Section Coordinator Dan Witkowsky, (Met. E. '66), 303/236-5202.

FOR RESERVATIONS AND ADDITIONAL INFORMATION, CALL 303/273-3290 OR 303/273-3295, OR, OUTSIDE COLORADO, CALL 1/800-446-9488, ext. 3290 or 3295.

ALUMNI UPDATES

40s

'49 **Russell L. Wood, E.M.** '49 and **Hon. Mem.** '86 is president and ceo of Asamera Minerals, Inc. in Wenatchee, Washington.

50s

'52 **William H. Ruchle, Geop. E.** has retired from Mobil Oil and is living in Texas.

'53 **John C.C. Mathewson, Geol. E.** has retired after 36 years with Western Geophysical and is living in Paonia, Colorado.

'55 **E. Dean B. Laudeman, Geol. E., Medalist '85 and Mines Medal '88** has retired from Unocal Corporation after 35 years of service. He will be moving his family back to Denver and opening an office to work in petroleum exploration and development.



John Blomberg, '56

'56 **John R. Blomberg, P.E.** '56 took early retirement from the Pennzoil Company and started an engineering consulting business in Parkersburg, West Virginia. He will specialize in primary and enhanced recovery planning and development in Appalachian Basin oil and gas operations.

60s

'62 **Donald A. Yunker, P.E.** is superintendent-operations for Chevron Corp./Ventura production office in Ventura, California.

'63 **Mokhtar M. Hamada, MSc. P.R.E.**

and **DSc. P.R.E.** '65 is a project engineer with Petrokemya, a Saudi-based petrochemical operation, and has relocated to Tokyo, Japan for the next two years.

'65 **John J. Schocke, E.M.** is general manager for J. Smith Coal Co. in Henderson, Kentucky.

'67 **Marc T. Pottorf, Geop. E.** is exploration services manager for Daniel Geophysical, Inc. in Dallas, Texas. **Louis B. Harmon, Geol. E.** is the southeast district supervisor-water quality division for the State of Wyoming/Dept. of Environmental Quality in Cheyenne.



Richard Kanda, '67

Richard Kanda, Geol. E. is a colonel in the U.S. Army Corps of Engineers and assumed command of the Detroit district on August 30, 1990.

'68 **Nilendu S. Mukherjee, DSc. Geol.** is director of geological and geotechnical services for Ensotech, Inc. in Burbank, California. **William S. Davis, Geop. E.** has been appointed vice president/exploration-Africa and

William Davis, '68



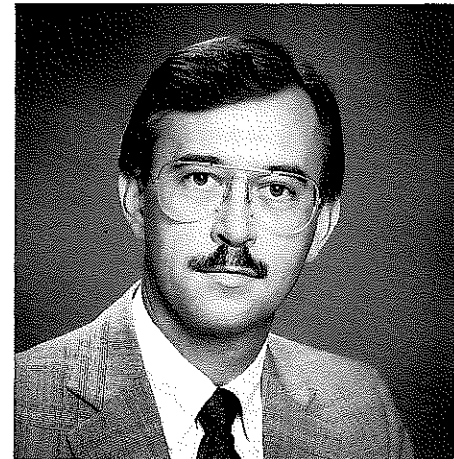
Middle East region by Amoco Production Company.

'69 **Stephen Hart, Geol. E.** has been appointed regional manager of Applied Geosciences, Inc. Colorado office.

70s

'70 **James Klein, BSc. Geop.** was honored by his employer with the Arco Outstanding Technical Achievement Award for developing and implementing a method for estimating net pay in the mineralogically complex Kuparuk C-Sand along with two colleagues.

'71 **Harry J. Briscoe, BSc. Geol. and MSc. Geol.** '73 is executive vice president of Tatham Offshore, Inc. which is a subsidiary of Deep-Tech International. He is also doing some consulting work for Tenneco.



Harry Briscoe, '71

'72 **George McFall, BSc. Met.** and his family are moving to Taiwan, Republic of China. He and his wife, Marlys, are missionaries.

'73 **Richard A. Van Horn, E.M.** is director/operations and long-term planning for Umetco Minerals/Union Carbide in Grand Junction, Colorado. **Jess R. Nunnelee, BSc. Pet.** is production manager for Wolverine Exploration in Ft. Worth, Texas. **James R. Hitt, BSc. Min.** is director of engineering for K & R Coal Company in Oklahoma City, Oklahoma.

'74 **Dave O. Cox, BSc. Pet. and MSc. Pet.** '77 has formed a new consulting firm, Cox Engineering Corporation in Golden.

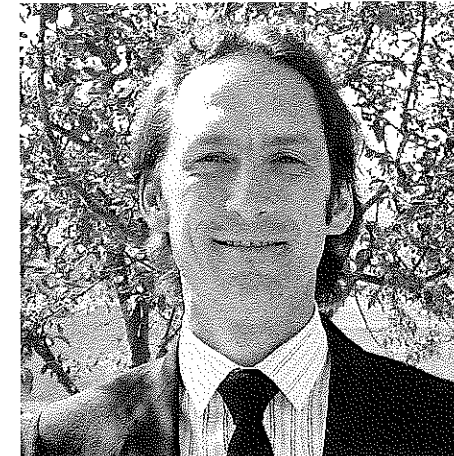
'75 **Henry E. Kolego, BSc. Min.** is public finance associate for Hanifen, Imhoff, Inc. in Denver, Colorado.

Richard E. Ackermann, BSc. Min. is a project engineer for Hecla Mining Co. in Coeur d'Alene, Idaho. **John C. Bozner, BSc. Geol.** is construction materials testing department manager for Aguirre Engineers, Inc. in Englewood, Colorado.

'76 **T. Arthur Palm, BSc. Min.** has been promoted by The Valley Camp Coal Company to president and ceo of Shrewsbury Coal Company, located outside of Charleston, West Virginia.

'77 **Marcus P. Randolph, BSc. Min.** is project manager for Kennecott Corporation.

'78 **Brian R. Frost, BSc. Geop.** is a staff geophysicist for Conoco in Houston, Texas. **William A. Miller, BSc. Geop.** is the district geophysicist for Pacific Enterprises Oil Company, USA in Denver. **Mark H. Wood, BSc. Min.** is senior mine planning engineer for Newmont Gold in Denver. **David F. Volkert, BSc. Geol.** is an engineer for Tupraq Metal Madencilik in Turkey.



David Volkert, '78

Bruce D. Wilkinson, BSc. Met. and MSc. Met. '82 is with Westinghouse in Aiken, South Carolina. **Donald N. Haines, BSc. Phy.** is an assistant professor at the University of Alabama at Huntsville.

'79 **Bruce A. Neuschaefer, BSc. Geol.** is a geologist with ERM-West in Irvine, California.

80s

'80 **Javan D. Ottoson, BSc. CPR** is operations superintendent at Prudhoe Bay in Alaska. **Kevin J. Bjornen, BSc.**

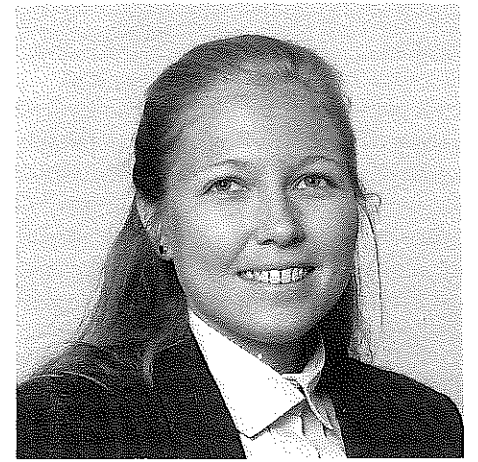
Geol. is systems supervisor for Dowell Schlumberger in Oklahoma City, Oklahoma. **Paul G. Pilcher, BSc. Pet.** is a math teacher at Woodstock Union High School in Woodstock, Vermont. **Diana R. Perfect, BSc. Geol.** is an engineering sales representative for Brock Easely. **Russell C. Fontaine, BSc. Geol.** is an environmental engineer for CSM Federal Programs Corporation in Denver. **Timothy E. Lien, BSc. CPR** has been transferred to Liberal, Kansas by Mobil Oil Corporation. He is a senior reservoir engineer.

'81 **Susan M. Perrell, BSc. Geop.** is senior environmental engineer for Four Corners Pipe Line in Long Beach, California. **Phillip Hedges, BSc. Geol. and MSc. Pet.** '88 was honored by his employer with the Arco Outstanding Technical Achievement Award for developing and implementing a method for estimating net pay in the mineralogically complex Kuparuk C-Sand along with two colleagues.

'82 **Joan M. Parker, MSc. Min. Econ.** is an MIS consultant for Dowell Schlumberger in Tulsa, Oklahoma. **Rick (BSc. CPR and MSc. CPR '86) and Pam (BSc. CPR) Edrich** are delighted to announce the birth of their daughter, Rebecca Marie, born July 19, 1990. **Michael R. Briggs, BSc. Min. and MSc. Min.** '85 is senior mining engineer for The Falkirk Mining Co. in Bismarck, North Dakota. **Todd M. Lasnik, BSc. Pet.** is an administrative petroleum engineer for Scientific Software Intercomp in Bakersfield, California.

'83 **Michael J. Nilsen, MSc. Min.** has been promoted to assistant controller of Gold Fields Mining Corporation in New York, New York. **James L. Hancock, BSc. Min.** is division mining engineer for Gold Bond Building Products in Memphis, Tennessee. **Daniel G. Collins, BSc. Geol.** is a computer programmer with Vexcel Corporation in Boulder, Colorado. **Philip C. Heidt, BSc. Chem.** is an advanced research chemist for Tennessee Eastman Co. in Kingsport, Tennessee.

'84 **Scott T. Higgins, BSc. Geop.** is party manager of Western Atlas/Western Geophysical in Algeria. **Wendi (Halverson) Cooksey, BSc. Met.** is a process engineer for Fluor Daniel in Sunnyvale, California. **Dean E. Shanklin, BSc. Geol.** is senior groundwater technician for Westinghouse Ma-



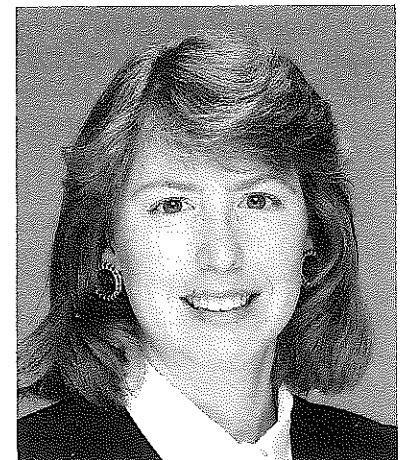
Melinda Truskowski, '85

terials Company. **William H. Dears, BSc. Min.** has been promoted by Caterpillar, Inc. to senior machine sales representative and is now in Plano, Texas.

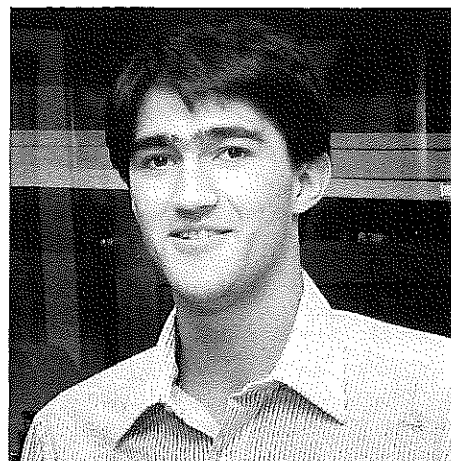
'85 **Melanie R. Bizal, BSc. Pet. and MSc. Min. Econ.** '89 is a uranium supply analyst with NUEXCO in Denver. **Jeffrey W. Sewell, BSc. Met.** is a materials and process engineer for Lockheed in California. **Brian J. Smith, BSc. Pet.** is operations supervisor for Metfuel in Tuscaloosa, Alabama. **Karl E. Kuchta, BSc. Min.** is general foreman of Vulcan Materials Co. in Columbus, Georgia. **Melinda Truskowski, BSc. Geop.** is 1990-91 2nd vice president of the Dallas Geophysical Society in Texas. **Sig E. Demos, BSc. Geop.** is a geophysicist for Master Seismic A.S. in Vestfossen, Norway. **Neil W. Strain, BSc. CPR** is an advanced process engineer for 3M Company in Minnesota.

'86 **Douglas R. Moore, BSc. Min.** is a mine engineer for USMX in Ely, Nevada. **Grant Alexander, BSc. Pet.** received his MBA from the University

Janet (Bensema) Hall, '86

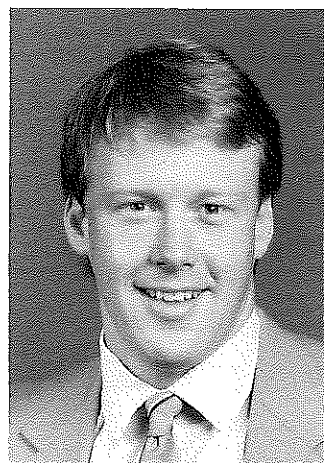


of Arkansas. **Patrick J. McGee, BSc. Geop.** is a party manager in London, England. **Michael J. Hawkins, BSc. CPR** is an MBA candidate at the University of Texas in Austin. **Janet (Bensema) Hall, BSc. Geol.** has joined the Nashville, Tennessee branch of Law Engineering. Law Engineering is an engineering and consulting firm that deals with geotechnical, environmental and construction materials.



Larry Fink, '87

'87 **W. Larry Fink, BSc. Math.** is a geophysicist for Phillips Petroleum Co. in Bartlesville, Oklahoma. **Mark J. Emanuel, BSc. Geop. and MSc. Geop.** '89 is a geophysicist for Chevron Exploration & Production in Houston, Texas.



Kelley Fetter, '88

'88 **John S. Cillessen, BSc. CPR** is a systems engineer for M.W. Kellogg in Houston, Texas. **Kelley V. Fetter, BSc. Eng.** has been assigned to the southern New Mexico and El Paso, Texas, territories of the Rocky Mountain region of Contech Construction Products, Incorporated. He is based in Albu-

querque, New Mexico. **Dean J. Gipson, BSc. Eng.** is a project engineer for Engineering Ventures in Temecula, California. **Alexander E. Gort, BSc. Met.** is a process engineer for Asarco in Hayden, Arizona.

'89 **Brenda Coon, BSc. CPR** is an advanced engineer in Pu recovery for EG&G Rocky Flats. **Colleen Brisnehan, BSc. Geop.** is an environmental geologist for Texaco Refining & Marketing Inc. in Universal City, California. **David Minke, BSc. Eng. and Mary A. Vickery, BSc. Phy.** '90 were married June 9 in Golden. He is a maintenance engineer at Asarco in Ray, Arizona and she is working on her PhD. at Arizona State University. **Richard J. Schepis, BSc. Met.** is a graduate student at CSM. **Bradley G. Baker, BSc. Pet.** is an engineer for Baker Sand Control in Houston, Texas. **Scott White, BSc. Met. and Laura Godette, BSc. Met.** '90 were married July 21 in Denver and honeymooned in Cancun, Mexico. They both work for Caterpillar/East Peoria plant as metallurgical engineers in Peoria, Illinois.

90s

'90 **David H. Andrews, Jr., MSc. Min. Econ.** works in the research department of Phelps Dodge in Morenci, Arizona. **Charles S. Baxter, BSc. Met.** is a mineral process engineer for Lina-

tex Corp. in Manchester, Connecticut. **Laura Godette, BSc. Met. and Scott White, BSc. Met.** '89 were married on July 21, 1990 in Denver and honeymooned in Cancun, Mexico. They both work in Peoria, Illinois for Caterpillar/East Peoria plant as metallurgical engineers. **Reed R. Figley, BSc. Eng.** is an engineer for Service & Technology, Inc. in Bartlesville, Oklahoma. **Eric P. Andren, BSc. Geop.** is a field engineer with Western Geophysical/Atlas Wireline Services. **Bryan W. Baird, BSc. Met.** is an engineer with Shell Oil Company. **Daniel J. Bangert, BSc. CPR** is a control systems engineer with Shell Oil Company. **Mary A. Graham, BSc. Eng.** is a second lieutenant in the U.S. Army Corps of Engineers. **David N. Usry, BSc. Met.** is a Q.C./process engineer with Chaparral Steel Co. in Midlothian, Texas. **Michael P. Nims, BSc. CPR** is a process engineer with Phillips Petroleum in Borger, Texas. **Cynthia M. Wong, BSc. CPR** is an engineer with Shell Oil Company. **Wendi Fowls Smith, BSc. Math.** is an ensign in the U.S. Navy. **Robert D. Smith, BSc. Eng.** is a project engineer with Conoco. **Mary A. (Vickery) Minke, BSc. Phy. and David Minke, BSc. Eng.** '89 were married June 9 in Golden. She is working on her PhD. at Arizona State University and David is a maintenance engineer for Asarco in Ray, Arizona.

WE SERVE MINERS
(and have for over 5 years.)



**Computer Aided
BUSINESS SOLUTIONS, INC.**

17000 S. Golden Road • Golden, CO 80401
(303) 279-1868 • FAX 279-5305

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 individuals. If you have more information please write to the editor.

Charles F. Moore, P.E. '51, MSc. P.R.E. '52, of Houston, Texas, died June 6, 1990. He is survived by his wife, Eunice, and three children.

Louis R. Michea, Jr., Met. E. '41, has died.

Albert T. Rylands, P.E. '34, of Wheat Ridge, Colorado, died in early 1990.

Gerardo A. Villasmil, BSc. Met. '79, of Henrietta, New York, died in June, 1989.

Raymond D. Houser, MSc. CPR '66, has died.

Ben Fishman, Geol. E. '31, of Denver, Colorado, died April 17, 1989.

Gerald G. Christensen, Met. E. '31, of Prescott, Arizona, has died.

Joseph Robinson, Geol. E. '41, of Massachusetts, has died.



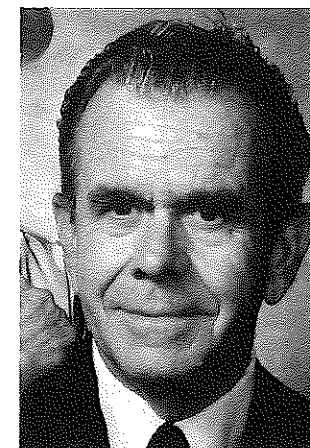
Steven Blanco '69

Stephen R. Blanco

Stephen R. Blanco, Geol. E. '69, MSc. Geol. '71, of Houston, Texas, died February 11, 1990. At the time of his death, he was a senior geological specialist with British Gas working on projects in South America. Steve joined Tenneco Oil Company as an exploration geologist in 1971 after graduating from Mines, and held a variety of domestic and overseas assignments.

He is survived by his wife, Linda, and son Keith.

The Mines Magazine • October 1990



William Elliott '33

William M. Elliott

William M. Elliott, 80, of Williamsburg, Virginia, died April 21, 1990. A native of Golden, Colorado, Elliott had lived in Williamsburg for many years. He was a Navy lieutenant during World War II. He graduated from Mines in 1933 with a degree in metallurgical engineering, and was a retired engineer. Following the war, he joined Kaiser Aluminum Company and later Phelps-Dodge until his retirement.

He is survived by his wife, Ruth, three sons and four grandchildren.

Charles T. Semerad

Charles T. Semerad, Geop. E. '61, of Weiser, Idaho, died June 26, 1990. He was born in Fort Collins, Colorado on June 16, 1938.

During his 22-year career as an exploration geophysicist with Amoco Oil Company, Semerad and his family lived



Charles Semerad '61

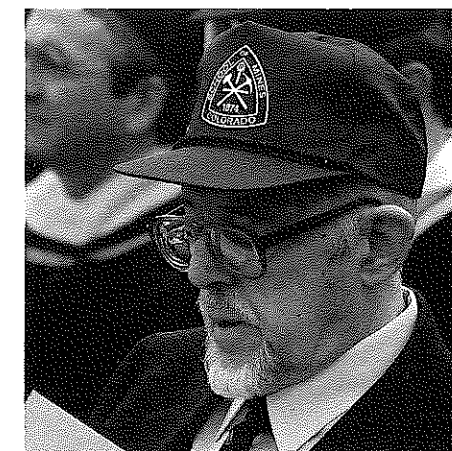
in Buenos Aires, Argentina; Chicago, Illinois; London, England; and Cairo, Egypt. He traveled and worked in 36 countries in the Caribbean, South America, Europe, the Middle East and North Africa. Semerad and his wife, Cathy, retired to a 25-acre farm in the Mann Creek Valley near Weiser, Idaho in 1984.

He was a member of the CSM Alumni Association and the Society of Exploration Geophysicists.

Semerad is survived by his wife; a son, Anthony T. Semerad of Grandview, Washington; and a daughter, Kelly Alicia of Fort Collins. Memorial contributions can be made to the Weiser Hospital Foundation or the Weiser EMT, 435 E. Park St., Weiser, Idaho 83672.

George G. Yeager

George G. Yeager, of Nashville, Arkansas, died May 18, 1990 following



George Yeager '40

his 50th reunion at Mines. Yeager, a mining engineer, had also participated last fall in the successful reunion of the 1939 championship football team, Mines' only undefeated football team. Yeager played defensive left tackle.

Yeager spent his career with Alcoa which included time in South America. He is survived by his wife, four children and seven grandchildren.

James L. Eirls

James L. Eirls, 70, of Pleasanton, California, died June 27, 1990 following an illness. He received a master's degree in mining from Mines in 1958.



James Eirls '58

Eirls had a long and varied career in engineering which included work with Tracor Aerospace, and while there he received an award from NASA for improved design of photovoltaic solar panels.

A native of Sedalia, Missouri, Eirls was honorably discharged from the Marine Corps after being wounded in the invasion of Okinawa. He was a registered professional engineer in California and Colorado. During his career he worked for numerous companies in the United States and abroad, where he installed factories.

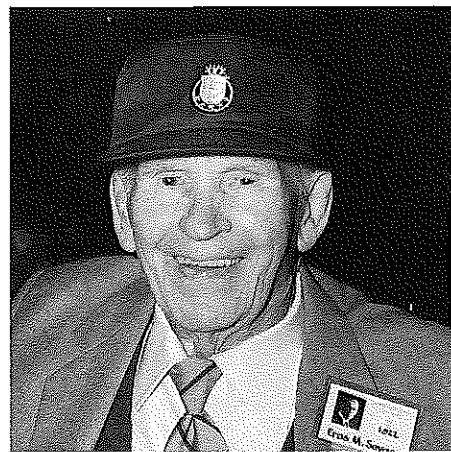
He is survived by his wife, Barbara; a sister, Betty Cornett of Dana Point, California; and two nephews. Memorial contributions may be made to the Rheumatoid Arthritis Foundation, 203 Willow St., San Francisco, California 94109.

Eros Savage

Eros Savage, E.M. '22, of Huntington Beach, California, died April 23, 1990 after a lengthy illness. He was born in Utica, New York October 27, 1899. After graduation he joined Shell Oil Company in Bakersfield, California. He was with Shell until 1930, when he decided to go into teaching and attended the University of Southern California for his M.A. He then went to the San Jose Unified School district where he taught at the local high school until his retirement.

In May 1989, and with the help of an attendant, he was able to attend a CSMAA reunion dinner.

Savage is survived by his wife, Laura; daughter, Marilyn Gray; stepson, William B. Shaver; granddaughters, Kathleen Marusak and Sharon Smith; and great-grandson Matthew Marusak.



Eros Savage '22

C.M. Watts

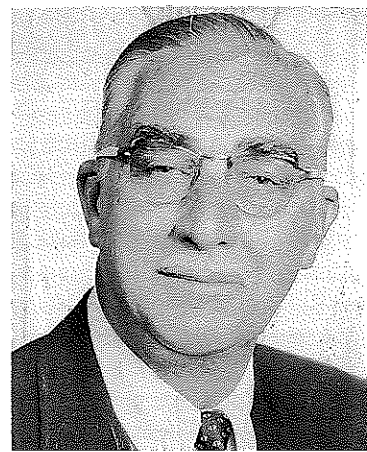
C.M. "Nick" Watts, Associate '26, died August 15, 1990 after a long battle with emphysema. Although he had to leave Mines following the death of his mother, before graduating with his class of 1926, Nick lived a life that exemplified a Mines' mining engineer.

His first job was in the copper mines at Ray, Arizona. He returned to Denver in the early 1930s with Rocky Mountain Fuel Company in coal sales and later as office manager. In 1942 he began a career with the federal government that would take him overseas for nearly 30 years.

He began with the Office of Price Administration regulating the price of coal during World War II, then moved to Hawaii with the War Assets Administration in 1947. In 1950 he went to Greece to develop lignite reserves for postwar power generation. During the stay in Greece he was sent on a reconnaissance mission to Vietnam to identify potential coal reserves.

From Greece Watts traveled to Belgrade, Yugoslavia in 1958 and while there was sent to Nepal to reconnoiter reported coal outcrops in the front range of the Himalayas. This trip required packing-in with Sherpa bearers and mules up streams and mountain trails to check out "brown stones that burn" for a potential energy source for Nepal. His report indicated that no viable reserves were found.

In the early 1960s Watts spent some six months in India consulting on energy development, then was named chief of the mining branch for the Agency for International Development in Seoul, Korea, where after five years he retired in 1967.

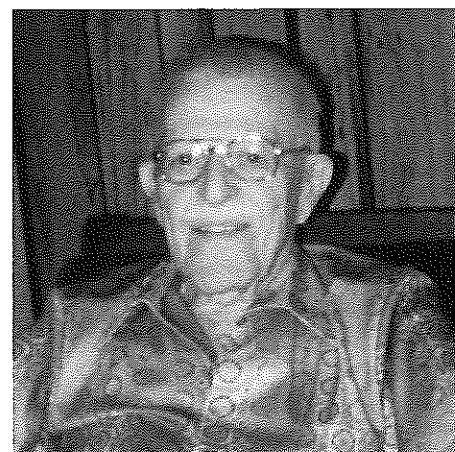


C.M. "Nick" Watts '26

Watts returned to settle down near a golf course in Cameron, Missouri. He was an avid golfer and boasted a hole-in-one at the Cameron course and on a cold, drizzly day, too cold for 18-holes, shot a 40 for nine on his 84th birthday. He is survived by his wife, Margaret (Peggy) Watts and son Bill, E.M. '52.

Lyle H. Henderson

Lyle H. Henderson, of Del Rio, Texas died at his home July 28, 1990 of a heart attack at age 87. Born in Kersey, Pennsylvania, Henderson graduated from Mines with a bachelor's degree in geological engineering in 1928.



Lyle Henderson '28

During World War II he served as a major in the Army in the Engineering Corps, mostly in the Philippines. He worked on the construction of aircraft landing fields.

Henderson was principal engineer on the construction of the Amistad Dam. He was also principal engineer of the International Water and Boundary Commission of the United States and Mexico, with headquarters in El Paso.

For more than 30 years Henderson worked in civil service, retiring in 1969 in El Paso, Texas.

He and his first wife, Kay, were the parents of two children. She died in 1954. Henderson married Lozier Condon in 1958 in El Paso.

"My husband was devoted to his work and was very involved in engineering," his wife said. "He was outgoing and friendly, and everybody liked him.

"He worked two more years after he completed supervising the building of Amistad Dam. After he retired, we did some traveling. We moved back to Del Rio in 1978."

Henderson was a member of First Presbyterian Church and Alpha Tau Omega fraternity, which he joined in college and continued his membership throughout his life. He was a member of the National Association of Retired Federal Employees.

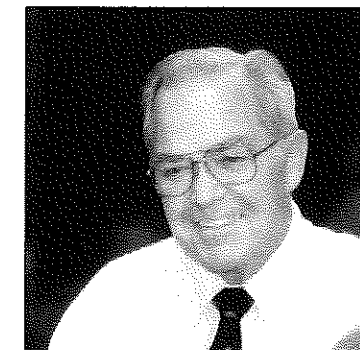
Additional survivors are a son, Michael Henderson of Las Vegas, Nevada; a daughter, Brenda Reeve of New Bern, North Carolina; a sister, Lorraine Kittle of San Bernardino, California and four grandchildren.

Lee W. Gibson

Lee W. Gibson, of Riverdale, California died August 19, 1990 at the age of 72.

Gibson was graduated from Mines in 1940 with a degree in geological engineering. As owner/operator of Lee Gibson Oil Company since 1953, he developed and produced oil leases throughout California, and in north central Texas. He made extensive geological engineering studies of oil and gas prospects in California, Arizona, Texas, Nevada, Oregon and Utah. He sold his business in January 1990 to Nana Oil and Gas Company of Mill Valley, continuing as operator until shortly before his death from cancer.

Previously he was a consultant in central and southern California, and a research engineer for the Humble Oil & Refining Company, Houston, Texas. He specialized in original research and engineering on problems relative to reservoir behavior and well completions. From extensive field experience and a mechanical background from a polytechnic high school in Portland, Oregon, he was inventive in improving



Lee Gibson '40

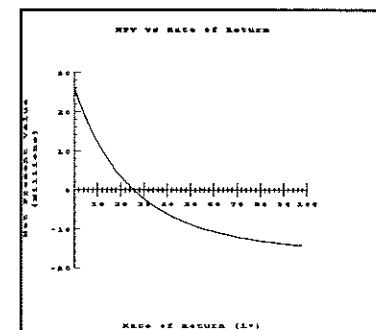
or developing many oil field tools and procedures.

He attended and enjoyed the Class of '40 reunion at Mines in mid-May, also an early family reunion celebrating his gold wedding anniversary, which would have been September 7, 1990. He is survived by his wife, Mary, two sons, four daughters, nine grandchildren, two sisters and one brother. The family requests that remembrances go to the Colorado School of Mines.

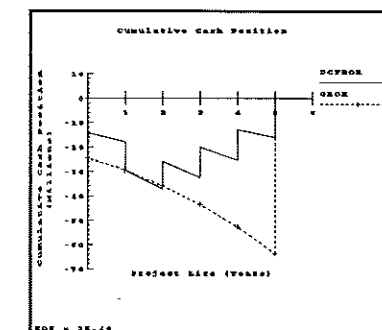
Software for Economic Evaluation SEE

Mineral ■ Petroleum ■ Chemical ■ Service

■ PC Based software for computing after-tax cash flows. ■ Based on the methods developed by Franklin J. Stermole in his short course "Economic Evaluation and Investment Decision Methods". ■ Easy to use menu-driven software with built-in help. ■ Ability to generate variable numbers of revenue/operating cost streams with complicated inter-dependencies. ■ Flexible reporting and graphing options.



Net Present Value vs. i^*



Cumulative Cash Position Diagram

Call or write for a demonstration disk.



SOFTWARE BISQUE

912 12th Street Golden, CO 80401
(303) 278-4478 FAX (303) 279-1180

For everyone who has expressed a desire to donate to a memorial fund for **Dr. Robert F. Faddick**, the family has established a scholarship in his name at the Foothills Academy, 4725 Miller Street, Wheat Ridge, CO 80033.

Foothills Academy is an independent, non-profit, private school in which Bob and his wife Mary Lou, who is also the School's Headmaster, have been very active.

Your tax deductible donations should be sent directly to the Robert R. Faddick Memorial Scholarship fund at Foothills.

For more information contact Ileen Neunzert (303/273-3650).

TAOS CONNECTIONS GALLERY

FEATURING
7TH ANNIVERSARY SHOW
OPENING OCTOBER 12 ♦ 5-9 P.M.

REGIONAL AND SOUTHWESTERN ART
OIL WATERCOLOR PASTEL

162 Adams Street
Denver, CO 80206
M-F 10-6, Sat 10-4
393-8267

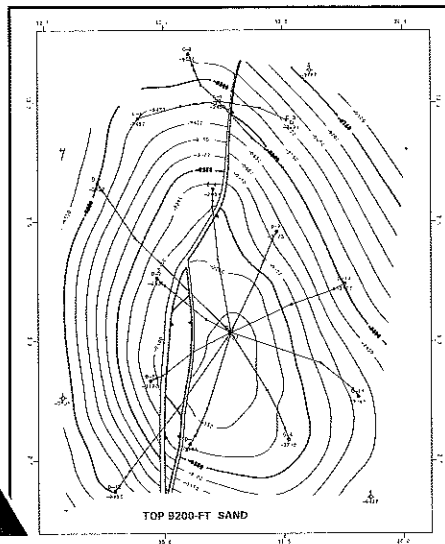
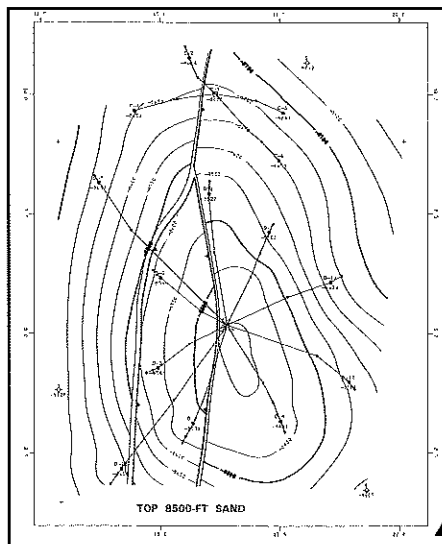
CHERRY CREEK NORTH, ADEQUATE FREE PARKING

We are proud to have provided CSM with the world's most powerful contouring system. MCS is a non-gridded (triangular) contouring system which:

- Always honors every data point
- Contours up to 30 surfaces simultaneously
- Integrates volumes rigorously, even in fault wedge areas
- Makes maps which look hand-contoured
- Handles multiple intersecting non-vertical faults among multiple surfaces.
- Handles directional wells correctly and automatically

MCS fault processing procedure:

- Contour all fault surfaces and fault displacements
- Restore to a non-faulted system (vertical, palinspastic restoration)
- Perform multisurface stacking of all structural surfaces
- Redisplace structural surfaces to their true position
- Generate fault traces as the intersection of structural surfaces and faults



SCIENTIFIC COMPUTER APPLICATIONS, INC.

810 Petroleum Club Building, 601 South Boulder • Tulsa, Oklahoma 74119 • (918) 584-6197

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

ASSAYING
GEOCHEMISTRY

GORDON H. VAN SICKLE '81
DENVER (303) 424-7718

WILLIAM L. LEHMBECK '82
TUCSON (602) 622-4836

RENO (702) 355-8826

Comminution

M
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

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) 444-8032



"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 Julio Rodriguez '87

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

Planning & Evaluation Technology™

Risk and Decision Analysis ■ Business Modeling
Seminars and Short Courses ■ Implementation Assistance

JOHN R. SCHUYLER '72, '77
15492 East Chenango Avenue
Aurora, Colorado 80015 (303) 693-1883

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

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) 891-9849
(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) 9871114

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

13053 West 3rd Place
Lakewood, CO 80228
United States (303) 985-1020
(303) 985-1904

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

COLOG
BOREHOLE GEOPHYSICAL SERVICES
GROUNDWATER ENVIRONMENTAL GEOTECHNICAL
Electric - Nuclear - Induction - Acoustic - Video
Robert E. Crowder, '78
• Digital Well Logging Services • Rental Equipment
• Interpretation - Consulting • Digital Upgrade Systems
• Analysis & Processing Software • Training & Seminars
Principal Office: 1019 Eighth St., Golden, CO 80501 (303) 279-0171 FAX: 278-3461
West Coast Office: 1318 Ross St., Suite F, Pittsburg, CA 94554 (707) 769-9094 FAX: 769-1099

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

CHD CANADIAN
HYDRODYNAMICS INC.
PRESSURE DATA & INTERPRETATION
N. M. (Nor) Hannon
#2260, 444 - 5TH AVENUE S.W.
CALGARY, ALBERTA T2P 2T8
PHONE 269-5416

digicon geophysical corp.
AUDREY LEONARD
REGIONAL MARKETING REPRESENTATIVE
ROCKY MOUNTAINS
Arco Tower • 707 17th Street • Suite 2946 • (303) 295-3541
Denver, Colorado 80202

Investments

SHEARSON LEHMAN HUTTON
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
DENVER, COLORADO 80203
303-832-5556
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 FAX-4685

Failure Analysis/Accident Investigations
Chemical Analysis/Mechanical Testing/Research
NDE/TEM/SEM/EDS/SRD/VES/AA/ICP/IR/IC
METALLURGICAL SERVICES COMPANY
Metallurgical and Welding Engineers
4102 Bishop Lane, Louisville, KY 40218
David C. Brown, Met. E., P.E. TEL: 502-968-5000
President FAX: 502-964-5000

CONSULTANTS IN MINERAL
PROCESSING AND EXTRACTIVE
METALLURGY
Terry McNulty, P. Eng., D.Sc. 1967
Doug Shaw
Dave Thompson, P.Eng., P.E. 1961
Doug Zunkel, P.Eng., D.Sc. 1967
T.P. McNULTY AND ASSOCIATES, INC.
P.O. Box 2740, Evergreen, Co. 80439
TEL (303) 670-0847 FAX (303) 670-0976

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/CONSTRUCTORS
777 S WADSWORTH BLVD.
LAKEWOOD CO 80226 (303) 988-4921

Mineral Economics

EIS **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

Andrew J. O'Connor, '78
Management Consultant
Arthur D Little Arthur D. Little, Inc.
Acorn Park
Cambridge, Massachusetts
02140-2300 USA
Telephone 617 684-5770
Telefax 617 681-5820
Telex 021428

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
Russell L. Wood '49 1601 Blake Street
Richard Waissar '62 Suite 510
Denver, Colorado 80202
William R. Wilson '65 TEL: (303) 620-0020
Robert L. Sandelur '66, '77 TLX: 640103
Alva L. Kuestermeyer '82 FAX: (303) 620-0024

Neil B. Prehn, P.E., E.M., '67
Tom Bruington, '80, '87
MINE DEVELOPMENT ASSOCIATES
MINE ENGINEERING SERVICES
SURFAC MINE SYSTEMS
702-323-5700
230 Rock Blvd., Suite 29
Reno, Nevada 89502
Telecopier: 702-323-6053

Pincock, Allen & Holt, Inc.
International Natural Resource Consultants
• Ore Reserves • Underground Mining
• Mine Hydrology • Open Pit Mining
• Mine & Mill Planning • Computer Modeling
• Groundwater & Environmental Studies • 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 John W. Rozelle, '78
Alva L. Kuestermeyer, '82 Robert L. Sandelur, '66, '73
Randall K. Martin, '77, '78 Donald B. Tschabrun, '81
Alan C. Noble, '70

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 • EIS / EA Preparation
• Feasibility Studies • Permit Acquisition
• Reserve Analysis • Computer Modeling
Alan Czarnowsky '75
Conrad Parrish '77
Jerry Nettleton '78
Robert Peterson '82
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, USA
(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: 03-821172
FAX: (403) 264-8297

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 Brian R. Disney, '82
Richard F. McClure, '82, '86 Dr. Jack A. Krug '70, '77
813 17th Street (303) 277-1629
Golden, CO 80401 FAX (303) 277-0119

LONG Consultants, Inc.
Independent Petroleum Engineers
D. R. Long
President
P.E. '67
1100 Milam, Suite 2090, Houston, Texas 77002
713-650-6828

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. 1982
 Telephone: (215) 431-9607 317 WEST MINER STREET
 WEST CHESTER, PA 19382

ROBERT E. MILLER '59
 Oil & Gas Exploration
 1300 S. FRAZIER
 SUITE 102
 CONROE, TEXAS 77301 756-8785
 A/C 408

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

Process Engineering
MERRICK PROCESS
 Merrick & Company ENGINEERING
 P.O. Box 22026 SERVICES
 Denver, Co. 80222
 303-751-0741
 • OIL & GAS
 • REFINING
 • CHEMICALS
 • MANUFACTURING
 JOE MAHONEY '86
 RALPH TOWNSEND '64

JOB MARKET SQUARE

Companies across the United States contact the CSM Alumni Placement Service when they have a position open. If you are seeking a new challenge in the industry, or if your firm needs a qualified engineer to fill a staffing requirement, contact: Kay Alexander 303/273-3294. Toll-free numbers: Inside Colorado 1-800/245-2060, ext. 3294 and Outside Colorado 1-800/446-9488, ext. 3294.

POSITIONS WANTED: #140— Fourteen years energy industry management experience in areas of electric power generation, synthetic fuels, environmental control technologies and business development activities related to energy and environmental industries. BSc. Chem. '73. #141—Corrosion engineer for 1 1/2 years. Designed systems to protect waste water treatment plants, water reservoirs, underground water lines, steam lines and gasoline distribution pipelines. Wrote corrosion evaluation reports. Has some experience in heat treating. BSc. Met. '88. #142—Design solutions to construction problems relating to drainage, paving and erosion/sedimentation controls. Program computer applications for cost control system. Has survey experience. BSc. Civil '88.

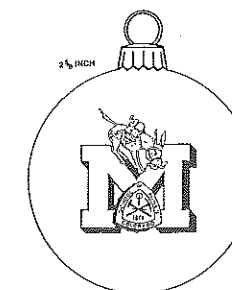
POSITIONS OPEN (9/7/90):
 #53—Mine engineer with up to two years experience. Needs good computer background for mine planning.
 #54—Scientific applications programmer to develop new software, enhance existing software for engineering applications and simulation systems for pipeline operator training, leak detection and predictive analysis.
 #55—Metallurgical engineers with experience in gold and silver processing; milling and heap leach background.

Real Estate
 3249 Mt. Diablo Blvd., Suite 101
 Lafayette, CA 94549
 OFFICE: (415) 935-9100
 RES: (415) 837-7723
JOHN W. SCHLENDORF, '66
 President
HERITAGE Better Homes and Gardens
 REAL ESTATE, INC.
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
 T2P0M2
 (403) 294-1234

Stocking Stuffers for that Special Alumnus!



DARK BLUE MUG with white spherical triangle on front and back, safe for microwave and dishwasher (\$5.75); note pad, white paper with a blue spherical triangle printed on each side (\$3.50); CSM shot glass with blue spherical triangle on one side and measurements of "freshman," "soph," "junior," "senior" and "grad" on the other (\$3.00); pewter rectangular belt buckle featuring "Blaster" (\$6.00); dark blue CSM felt pennant (\$2.00); CSM license plate frame of die cast metal with white letters on blue background (\$5.00).



ADD A SECOND UNIQUE CSM ORNAMENT TO YOUR HOLIDAY COLLECTION! The white 2-5/8" glass ornament with blue CSM logo is individually gift boxed and sells for \$5.25. **ALSO AVAILABLE** in the same colors and with the same logo, are CSM candle holders. Each white glass candle holder contains a replaceable votive candle, and is attractively gift boxed. (\$6.50)

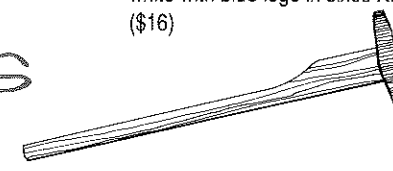


RECOGNIZE SUCCESS . . . THE CSM CROSS PEN
 Choose the "Gray by Cross" Selectip Rolling Ball Pen for that proud CSM graduate. This Gray Cross pen is attractively designed with the blue and silver CSM Spherical Triangle affixed to the stem. The pen, packaged individually in an attractive gift box, comes with two refills. (\$30)
FOR THOSE COOLER DAYS! Randall A. Reddig, Math. '88 and Koreen Guillermo, CPR '89, are wearing CSM sweatshirts available through the Alumni office. The shirts, cotton/acrylic blend, are machine washable and dryable. Available in blue with white logo or white with blue logo in sizes XL, L or M. Please state size and color. (\$16)



BABY BLASTER, a gray, black and white silky soft, huggable stuffed burro, which sits 10" high and is machine washable and dryable. The CSM mascot is a perfect gift for the new grad, a grandchild, sweetheart or anyone who loves stuffed animals. (\$16)

THE MINER'S PICK



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

CSMAA ORDER FORM

ORDERED BY:

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

SHIP TO:

Name _____
 Address _____
 City _____
 State _____ Zip _____

Handling Charge
 up to \$10 \$2.00
 \$10—\$20 \$3.00
 over \$20 \$4.00
 Allow 3-4 weeks for delivery.
 Prices are subject to change.

Gift card should read to: _____

from: _____

Description	Quantity	Unit Price	Total

Make checks payable to CSMAA.
 Mail order to: The Miner's Pick
 P.O. Box 1410, Golden, CO 80402

Total for merchandise _____
 Sales Tax: Colorado Residents add 6.2% _____
 Shipping, handling and insurance _____

TOTAL

Wilfley pumps survive in the most hostile environments.

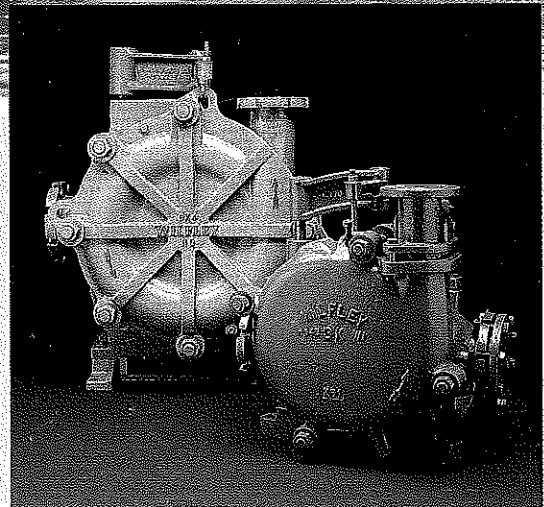


The bayou: A severe environment for survival.

The bayou is not unlike many industrial environments where process equipment faces its ultimate test.

Wilfley Pumps are used throughout the mineral processing industry in the toughest installations.

Wilfley can pump the easy stuff, but Wilfley's outstanding ability to survive is best utilized when the pumping environment is at its worst.



Wilfley Models HD and K Sealless Slurry Pumps have the quality design and construction to survive hostile environments.

WILFLEY

It's simple, Wilfley builds better pumps.

A.R. Wilfley and Sons, Inc.
P.O. Box 2330/Denver, Colorado 80201
Phone: 303-779-1777/Telex: 045-543