

**Gold and other metals—
Where will the metals industry
be in the 21st Century?**



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The collage features a data table with columns for 'Section', 'Lat', 'Copper', 'Silver', 'Zinc', 'Lead', 'Cadmium', 'Arsenic', 'Molybdenum', and 'Mg/Ag'. It also includes several charts: a ternary diagram for 'Furnary Diagram of Arseny Results', a scatter plot for 'Scatter Plot of Zinc vs Copper', a histogram for 'Histogram of Zinc', and a 3D model of a pit design. A map at the bottom shows 'TECHBASE BLVD.' and 'AIRY CANAL'.

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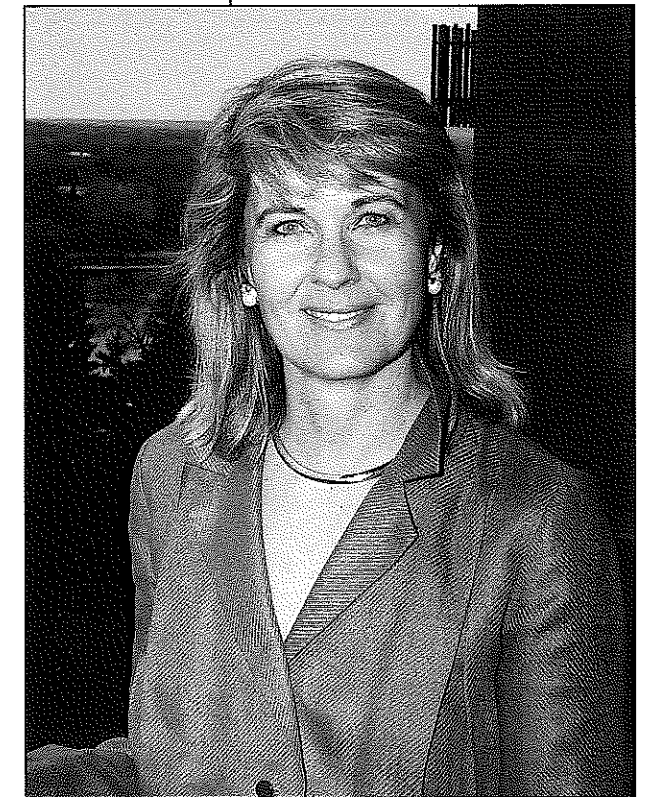
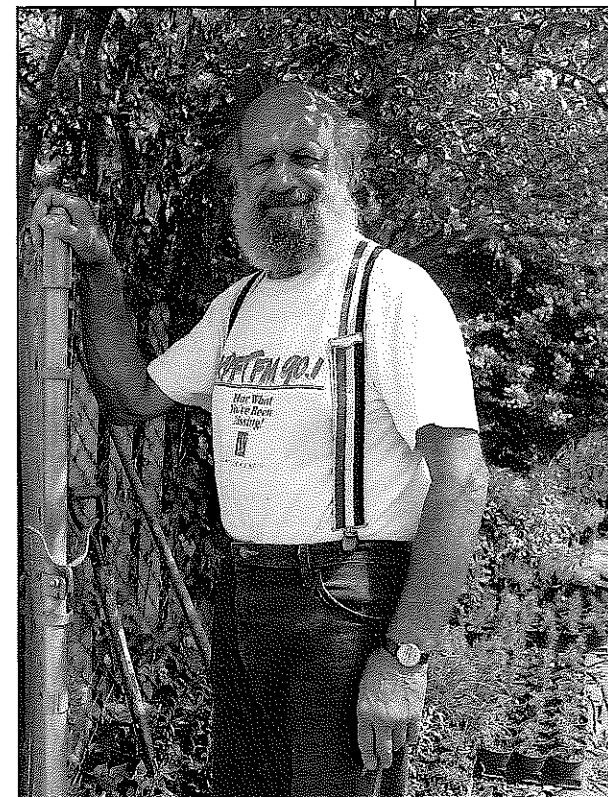
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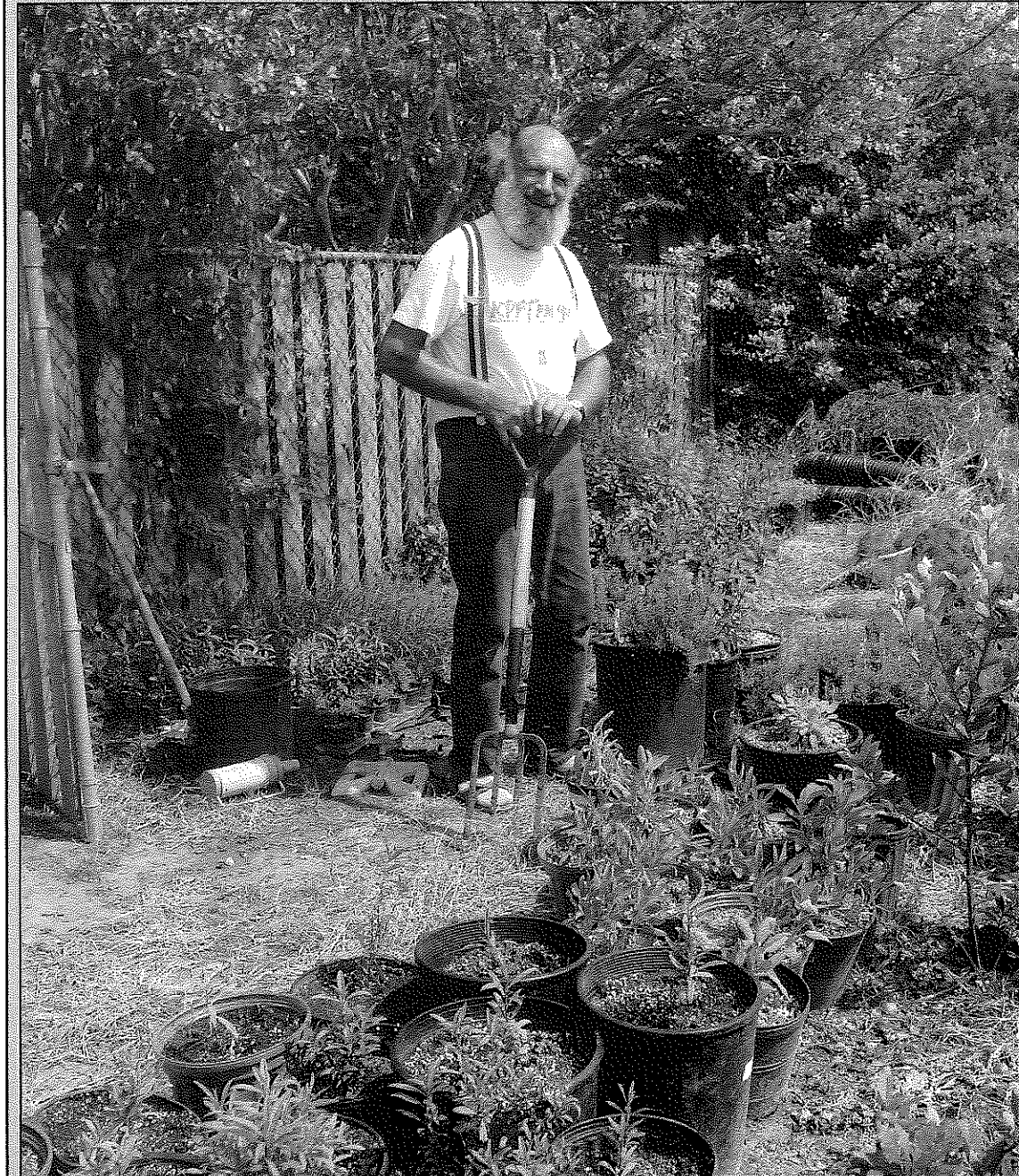
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Sol Meltzer is the
"Herb Man of Houston"



The "Herb Man" grows herbs on a large scale and sells directly to nurseries, plant shops and health food stores.

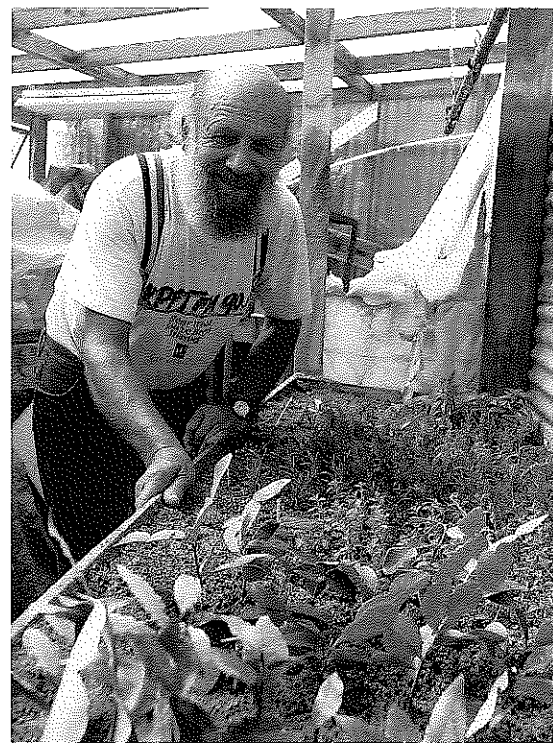
by Ellen Glover

Reading Sol Meltzer's book, *Herb Gardening in Texas*, is like sitting around a family dinner table and dropping in on a conversation. Even if you haven't lifted a finger in a garden, or can't tell the difference between tarragon and thyme, Meltzer, a Mines alumnus and retired geologist, makes growing herbs sound appealing and relaxing.

Meltzer's herb garden measures 60 by 70 feet, and he grows almost every herb he has written about, approximately 100 different varieties of herbs. What started out as an avocation has turned out to be a business supplying Houston restaurants, nurseries, health food stores, plant shops, and other retail outlets with both potted plants and dried herbs.

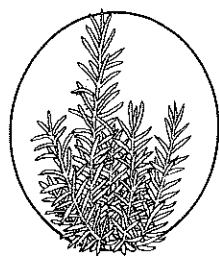
While he was working for Cities Service Oil Company he would spend his weekends—and often in the mornings before work and in the evenings after office hours—growing herbs. He has talked to garden clubs and school groups about herb gardening, hosted radio and television shows and wrote a monthly garden column for *The Houston Gardener* and *Houston City Magazine*. Additionally, he has taught a course on organic gardening.

And in 1977 Gulf Publishing Company brought out his book, one of the few volumes, if not the only one, on growing and caring for herbs in Texas. The book is in its third printing.

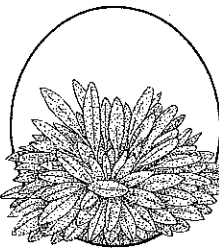


Sol says herbs are easy to grow and offer a rewarding experience.

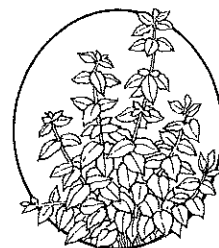
"I consider myself a knowledgeable grower; whether I'm a worthy author is for you to judge," he says in the preface of his book. "Writing this book was fun. I'm sure you'll find several good



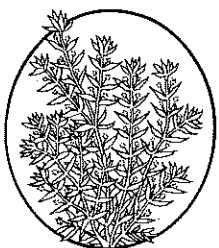
ROSEMARY



LAMB'S EAR



LEMON BALM



SAVORY

ideas, have a laugh or two, and agree with me that herbs makes scents in Texas."

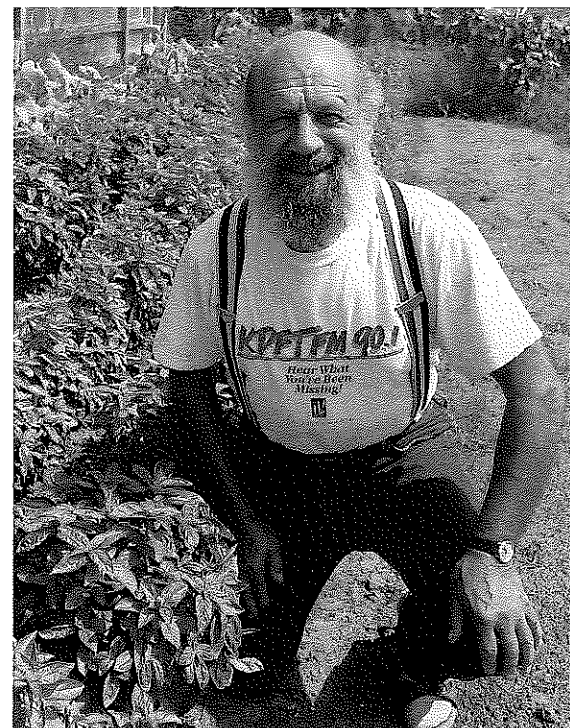
While visiting Golden in May for his 40th reunion with his wife, Thelma, he casually mentioned his interest in gardening and how he got started. "When I was at Mines I lived in an apartment unit that had a big garden area and a fellow who lived upstairs from me had a truck garden in the summers to make money. He got me started."

After college Meltzer's geology jobs took him all over New Mexico and West Texas, to Cities Service's headquarters in Bartlesville, Oklahoma, to Calgary, Canada, and finally to Houston. Wherever it was possible he had a vegetable garden.

He got interested in growing herbs shortly after arriving in Houston in 1966. "I don't really know what got me interested in herbs," he says. "I think my first herb was rosemary. It smelled nice and different, and it was a new experience. And it just went from there," he says as he strokes his thick grizzled beard.

Unlike most gardening books which can be dry, stuffy and distant, Meltzer comes through on every page of his book. When he talks about starting seeds indoors he says "Although it is usually recommended that you wait until the seedlings have at least four leaves before transplanting to individual containers, if you are impatient as I am, with a little care you can transplant when the seedlings have a pair of leaves. I have grown and transplanted thousands of seedlings with one set of leaves and have lost very few."

And his humor shines through in the descriptions of herbs where he gives the cultivation re-



Sol supplies about 12 Houston restaurants with fresh herbs, including basil.

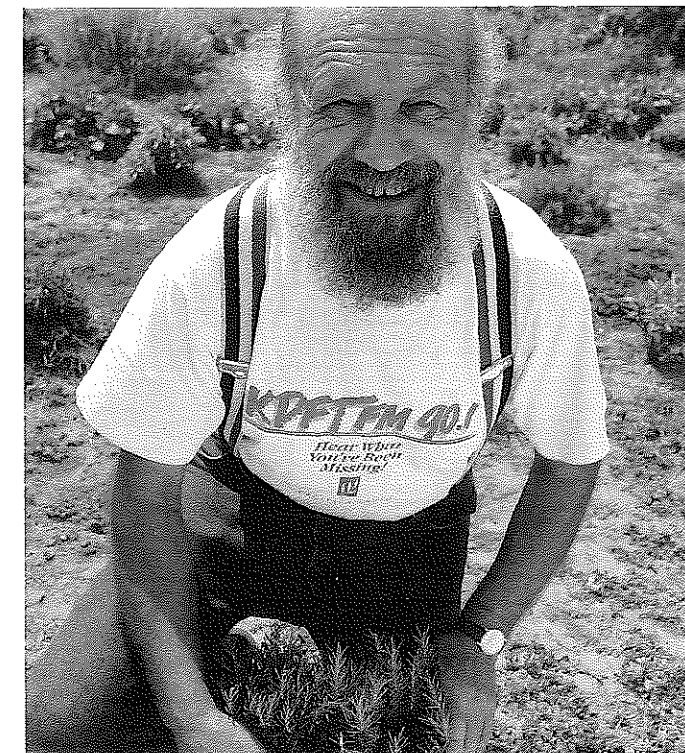
quirements and how the plant is used. Under "Lamb's Ear", a hardy perennial that is a foot tall with soft downy long linear gray leaves Meltzer says he has read "that the juice can be used to heal cuts and old sores. I'm old, so I presume it will heal any sores I have." And under lemon balm, an herb used for tea and a garnish for fish, he says "lemon balm tea, according to one 15th century herbalist, is good for female complaints. If your wife complains, about anything, fix her a cup of tea and advise me of the results." His most thoughtful remark can be found under savory: "This is one of my wife's favorite herbs, and because she's my favorite, it's one of mine."

Meltzer is well-versed in the lore surrounding uses of herbs. He includes a chart of diseases and herbs that can cure them:

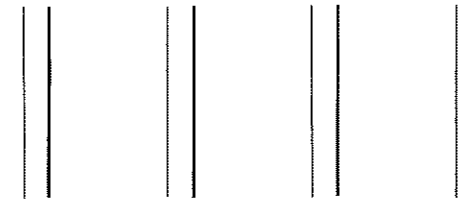
Disease	Herb(s) That Cure	Comments
Baldness	Beets, yarrow	Doesn't work
Blastings by lightning	Purslane	No comment
Bad Breath	Mint, rosemary	They both work
Forgetfulness	Agrimony	I forgot if it works
Baldness	White mustard	No way
Lust	Hemlock	It's a poison; it'll stop you forever

The book contains more helpful information and more reflections of why herbs keep him in the garden. "Herb gardens have a peculiar charm," he writes. "Many of the plants have an almost fairy-tale appearance. Walking through an herb garden, with its exotic fragrances and rainbow colors, can

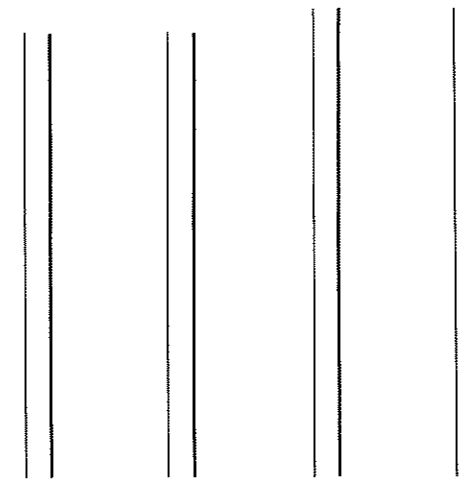
really be a spiritual experience. Some people think of herbs as dull green, unattractive plants. But just explore an herb garden; you'll find it a sensual delight." ▲



Sol Meltzer with one of his favorite herbs, rosemary.



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The Materials Industries Trends and Predictions

by Ellen Glover



Stan Dempsey, president of Royal Gold, spoke on the future of the gold industry.

As part of the Department of Metallurgical and Materials Engineering centennial held in Golden in June a number of papers were presented by alumni and industry representatives. They offer a broad perspective on the mineral and materials industries in the 21st century, and point to where and how graduates may be working after the year 2000—above and below ground on an international scale with high tech methods, but with an understanding of fundamentals acquired at the Colorado School of Mines.

Gold mining—prices dip, but its allure continues to rise

Stan Dempsey, chairman and CEO of Royal Gold Inc., focused on the future of gold as seen through the eyes of an explorer and producer, but particularly a corporate view of the gold industry. Dempsey, who is also in-

involved in investment banking and environmental services, says the gold industry is commercially driven, and that research or technical development is for the most part done by industrial vendors and not supported by the producers.

Dempsey spent most of his career in molybdenum and iron ore, and developing lead, zinc, and copper. While a vice president with AMAX, he worked in Australia to integrate the various businesses of AMAX into a commercial enterprise that could be floated on the Australian stock market. He says there are some things about the gold industry that are different from other minerals. For example:

- the technology is basically the same since the 1930s.
- gold provided an easy entry for anyone to go into the mining business.

Dempsey said it was easy to get into gold mining partly because gold is so readily marketable. Most commodities have a market risk, but gold, while it has the risk of price, can always be sold. "A lot of times you're willing to sell it at any price and glad to get the money," he added.

Dempsey says he has researched the size of mines from the 19th century, and has noticed a lot of the gold mines were really large compared to what they are looking for now. As a comparison, California in 1851 produced 3.9 million ounces of gold while production in the United States didn't hit that level again until 1987. He added that people don't realize how really prolific some early production was, whether in Colorado or California.

"If you put the whole gold industry into perspective today, production was about \$25 billion in U.S. dollars last year. That's less than R.J. Reynolds Company sold for with junk bonds. Think about that . . . one tobacco and consumer products company sold for more than the total sales price of all gold produced in the world last year," he said.



Marco Ginatta '71 of Torino, Italy, spoke on the future for titanium. His family has owned a titanium business since the 1920s.

Exploration trends

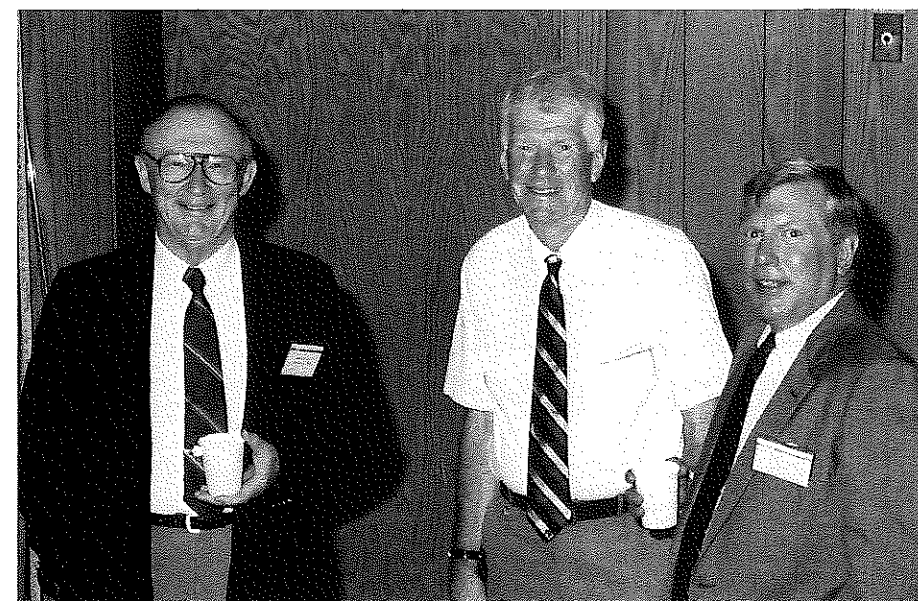
Dempsey says the trends in exploration will be:

1. To find the areas easiest to permit, an environmental theme that underlies many mining decisions today.
2. Explorationists will have to work a lot harder on fundamentals. He cited the need for better accuracy in samples or ore reserve estimation, and a concern over fraud in the industry . . . "it's awfully easy to steal gold."
3. He also sees companies consolidating: smaller firms will be acquired by larger concerns.

He also sees a trend in exploration toward settling in on a target size for mining. He recalled visiting with a prominent mining manager from one of the big gold companies who claimed his company wouldn't look at anything under a million ounces, but now a target of a million ounces is hard to find. He sees people settling on 200 to 300,000 ounce targets as being worthwhile.

Dempsey explained that today most gold companies are reserve poor: com-

in the 21st Century: from Alumni



Friends and metallurgists (l to r) Newell Orr '54 of New Jersey, Marvin Gantz '40 of Pennsylvania, and Doug Zunkel '66 of Washington took a break during the June reunion to discuss their experiences in the metals industry.

panies are driven now not only to get deposits, but to get those reserves into the proven and probable category. "You have to have reserves if you are going to continue in the business," he said.

The executive stressed the need to return to fundamentals and gave the example of Echo Bay Exploration Inc. which had difficulty in sampling reverse circulation drilling in one of their gold deposits in Nevada. In their annual report they disclosed difficulties in this process; a miscalculation of an ore body led to incorrect decisions on the number of ounces recoverable from the deposit, financial decisions, etc. which were all based on the first core sample. Dempsey praised the gold company for being so honest in their annual report, a quality he would like to see more often.

"While we're awfully interested in all the exotic technology, we need to audit a little bit to make sure we're doing the basics. Those problems continue to plague the gold industry and, in fact, it has hurt our ability to get gold loans," he said. Gold loans are

Production trends: closely tied to supply and demand

South Africa still dominates the gold business in terms of supply: 37 percent of the total in 1989, or 19 million ounces of production last year, but a lot of gold mines in South Africa are under water because of the price of gold at its mid-June level of \$350 an ounce.

In the United States, gold production rose to 259 tons, a little over 8 million ounces. Homestake Mining Company, one of the country's largest producers, produced more than one million ounces total as a comparison to South Africa.

According to Michele Stell, mining analyst for the investment firm Neidiger/Tucker/Bruner Inc. in Denver, the main cause for the decrease in the price of gold is the "strength of the U.S. dollar, dropping interest rates and renewed confidence in the economy. People are putting their money in other investments besides gold."

The \$350-an-ounce level may hurt smaller companies more than larger corporations if it stays at that level for very long, Stell said.

borrowing a specified number of ounces of gold at current prices and promising to repay it as gold is produced, usually from the new or acquired venture. Canyon Resources of Golden borrowed 32,173 ounces of gold earlier this year and immediately sold it for \$416.50 an ounce, raising \$13.4 million.

**Gold pour at the Fortnum Mine in Kalgoorlie, Western Australia
Grenville Turner ©/Homestake**



"The smaller companies have more at risk," Stell said. "They may not have the assets to sustain them if gold prices stay low."

Many small companies rely on income from current production to operate from quarter to quarter, and a drop in gold prices not only affects their current income, but also seriously inhibits their ability to explore, expand or acquire other properties.

Larger companies, as a contrast, have the financial ability to hold their own or possibly even turn a profit through a downturn in prices. These companies have reserves to stockpile and sell their gold when the price goes up, practicing "hedging," or buying gold at low prices and selling after the price goes up, Stell said.

Larger companies also may take advantage of the low-cash position of smaller companies by acquiring them. However, although the current gold price is hovering below \$350, many companies may be selling their gold at a price closer to the \$400 mark reached last year because of a practice known as "selling forward." When a company sells forward, it locks in the current price for a certain number of ounces it produces in the future.

Dempsey says he resists making price predictions, but likes the old saying that an ounce of gold is worth the cost of a man's suit. "The price of running public companies is so high that consolidation among companies is inevitable; it takes \$1 million to run a public company. It's a great time for major gold companies to pick up deposits; a

lot of small companies have done quality work and so that work will benefit the major companies," Dempsey said.

He also said since prices are difficult to predict most mining companies focus the majority of their attention and efforts on controlling mining costs to keep a balance between costs and the price of gold.

Access and the environment

He mentioned that now the United States has a pretty favorable situation in regard to access to public lands for mining. That certainly will change if Congress alters the mining laws. Access also plays into environmental issues: Don't put that mine in my backyard or I'll use the environment as an excuse to keep it out.

Dempsey sees tougher environmental laws coming, perhaps even a federal reclamation system administered by states for all mining, and technically developed reclamation systems, not just reseeded tailings with grass. This may pose problems for the mining industry "because it's going to probably put it out of business in the U.S."

He called for a better systems approach to cleaning sites, and better working relationships between technical people and policy makers, an arena "dominated by lawyers who are short-term pragmatic problem solvers, not systems-oriented people. Technical people are not well represented in any policy debates, and it remains a challenge to enter this arena in a positive way, and apply technology effectively."

AN ENDURING VALUE

There is no doubt gold holds a unique position in history. Why has gold maintained an enduring value? It could be attributed to its scarcity, beauty, malleability, durability, portability and conductivity.

Homestake Mining Co., one of the largest American gold mining companies, provided *Mines Magazine* with some statistics on gold. It is estimated that in man's recorded history, about 3 billion ounces, just over 93,000 tons, of gold have been produced. That sounds awesome, until it is compared to last year's production of aluminum, over 13 million tons, or last year's production of copper, over 8 million tons.

Beauty and malleability are tandem traits both contributing greatly to the metal's worth. Because gold is so soft, ancient artisans could use primitive tools to easily shape coins, jewelry and religious objects. Gold's malleability is illustrated by two statistics: a single ounce of gold can be spun into a wire nearly 35 miles long or beaten into a sheet only one ten-thousandth (1/10,000) of a millimeter thick and 170 feet square. Gold is still the metal of choice among jewelry fabricators, who consume more than 80 percent of all gold fabricated in the Western world.

Gold is one of the best conductors of electrical energy. Because of its relative high cost, gold was for years priced out of the applications markets and silver, copper and aluminum were substituted. As the aerospace industry advanced and high tech electronics became more sophisticated, absolute integrity in circuits became a business necessity. While this market is small in comparison to jewelry, it has increased more than 70 percent in the last ten years.

Other uses for gold include electronics, dentistry, coins and medallions. The United States consumed nearly 4 million ounces, and more than one third of that total was in electronics.

For centuries, gold has been a global currency-fiat money. For all intents and purposes, gold has an internationally intrinsic value independent of any supporting government or financial institution.

Mining engineering, once the staple of education at Mines, has fewer graduates (less than 15 from June 1989 to May 1990) but they are in demand. According to statistics released by the school's career planning and placement center, of 11 graduates nine sought help from the placement office which set up 135 interviews, or 15 interviews per graduate.

The average starting salary was \$31,345, about a three percent increase over the previous year. Companies seeking Mines grads included Amax Gold, Amax Coal, Asarco, Bridges Coal Co., Farco Mining, Phelps Dodge, Phillips Petroleum, Santa Fe Pacific Coal, The Pittston Company, and other gold and coal companies.

For the most part, companies were hiring BS graduates, but graduate students were also in demand:

Total requests:					
1989-90 BS	40	1988-89 BS	23	1987-88 BS	14
MS/PhD.	19	MS/PhD.	14	MS/PhD.	6

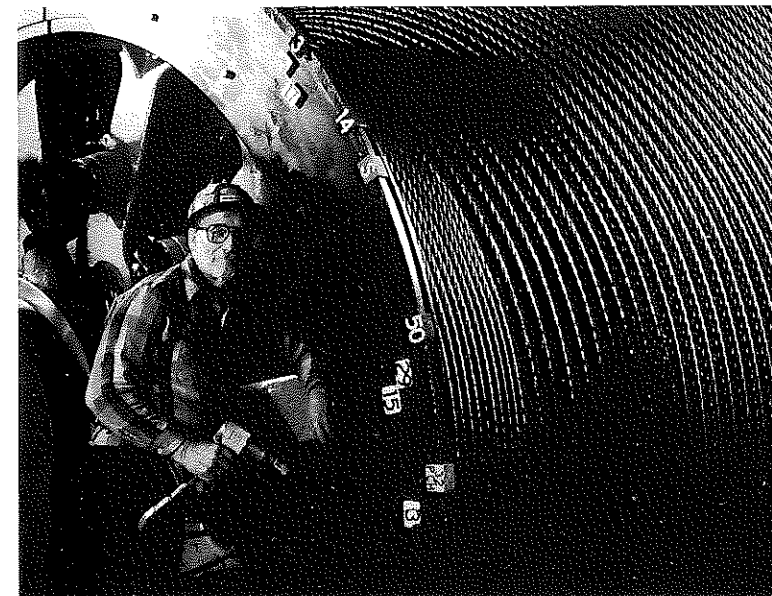
Salary figures were not available for graduate students. The Mines placement staff says the interest by mining companies is not for a number of graduates, rather for one special person who can fulfill a company's needs, a reflection of the cyclical nature of the industry.

Zunkel sees no change for copper

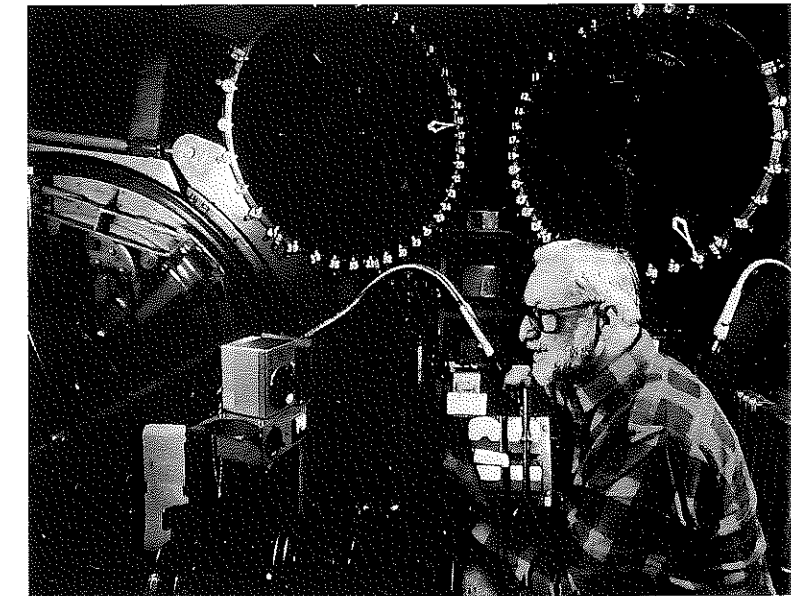
A.D. "Doug" Zunkel, MSc. Met. 1965 and DSc. Met. 1967, is a consultant to mineral and chemical industries. He looked into the technological crystal ball regarding nonferrous smelters and refineries and product applications in the early 21st century for base metals (lead, copper and zinc) and concluded that copper and zinc smelters and refineries will look, operate and perform economically much like they do in the early 1990s. "Lead smelting and refining will undergo a technological revolution in the 1990s leading to the extinction of the conventional sinter-blast furnace-kettle refining process in the

early-mid 21st century. It will be replaced by the environmentally improved QSL, Kivcet, TBRC, or flash smelting technology and by continuous refining. Primary and secondary lead processing will integrate as new plants replace the old," he said. Zunkel said that inadequate support of base metals smelting and refining technology development, particularly in North America, during the 1980s and early 1990s will become more apparent, as little new technology will be available for application and that which has reached commercial applicability will have been developed overseas.

Hoist for the Ross Shaft at the Homestake Mine in Lead, South Dakota
Marvin Silver ©/Homestake

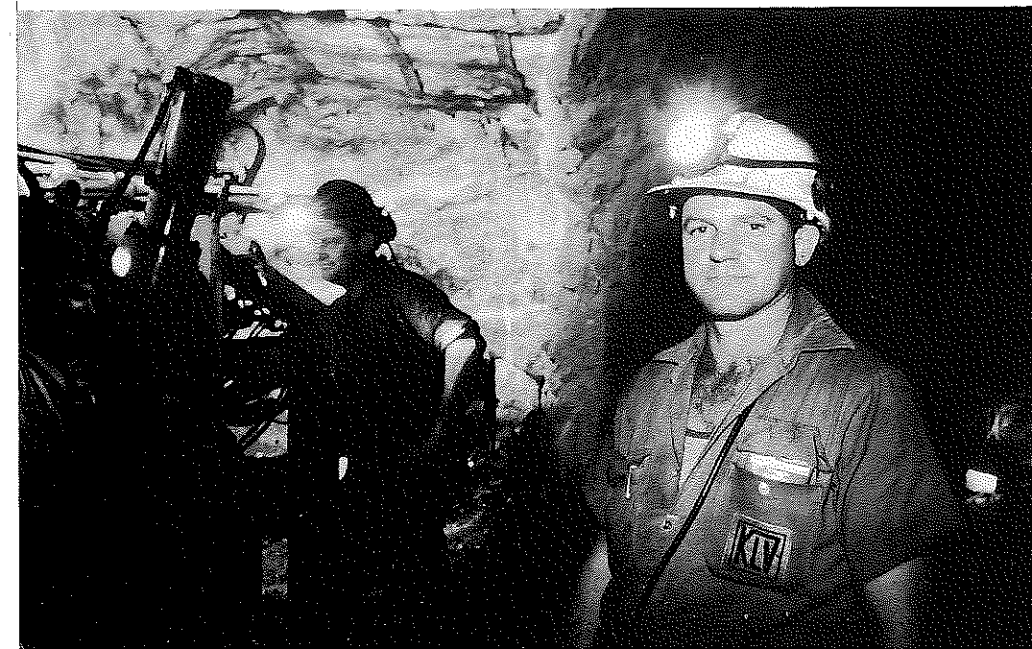


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Gig rise miner at the Mt. Charlotte Mine in Kalgoorlie, Western Australia
Grenville Turner ©/Homestake



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McNulty predicts mineral processing to survive despite downturn in economy

Dr. Terrance McNulty, distinguished alumnus and a trustee on the CSM Board of Trustees, opened the metallurgical reunion with a talk on the future of the minerals industry. McNulty, past president and CEO of Hazen Research, gave a perspective on problems facing the mineral industry, and said that in minerals research and development there has been a decline in commercial commitment.

In terms of the number of people employed and the approximate amount of money spent in 1980 there were 1,700 people working in research with about \$133 million worth of work. By 1989 those figures had changed to 300 people performing about \$18.5 million worth of work, or about ten percent of the effort in 1980 which means a lack of effort in long-range development of technology.

McNulty covered the limitations of the technology used by the mineral industry, and said research has yet to discover good tools for finding deeply buried deposits with no clear surface indication. He outlined some research in processing including growing interest in electrochemical control of flotation. In process control sophisticated software and computers are managing information. He also said improved approaches toward extraction of minerals, including some new separation tools, holds hope for metallurgists.

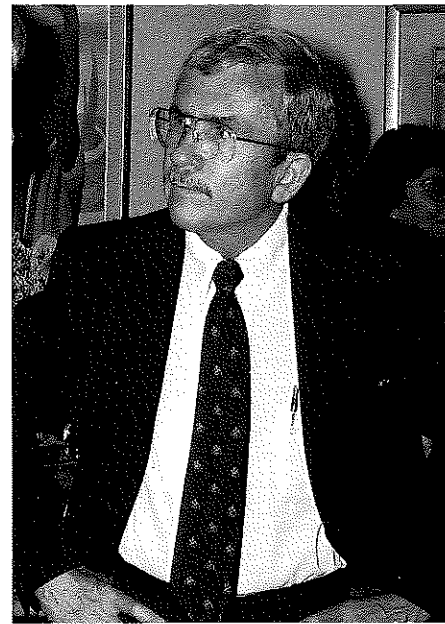
The impact of environmental regulations on the minerals industry was a theme for both McNulty and Stan Dempsey (see related story). McNulty

said prior to 1980 there wasn't much of a concern about disposing hazardous waste, and the cost of disposing a barrel of that material prior to 1980 was about \$2.50. In 1981 that cost jumped to \$100 and continued to inflate through 1988 when it cost \$600 a barrel.

"Now it is becoming a question of where you can dispose of it rather than the cost. Various wastes simply cannot be put in a landfill anymore so that kind of thing is not only putting some limitations on how we process minerals, it's also creating some new economic opportunities in the mineral processing field, he explained.

"The subject of mining being excluded from some of the regulatory pressures that have been applied to other solid wastes is important. At some time we're going to be in a fix where we will not be able to produce residues that contain leachable heavy metals. That is a problem on one hand and opportunity on the other hand. We're finding growing interest in remediation of wastes by processing. So companies like Hazen Research (a private research and development company for the mining, minerals and chemical processing industries) and others are finding that a larger percentage of the development that they do is not on minerals, it's on wastes. There are a lot of things that we can do as mineral processors to deal with these kinds of problems," he said.

McNulty says there will always be a mineral processing industry even though "those of us who are trying to



Dr. Terrance McNulty

find consulting work in mineral processing and those of you who are trying to interest students to enter the field wonder at times if there is going to be an industry.

"There always will be mineral production and where that is done and how it is done is going to be governed by economics at the time, political and social frameworks, and the country in which it is to be contemplated. There will continue to be challenges and I think life is going to go on in mineral processing . . . it's easy to be a little discouraged about it right now. I think that we will be seeing things in a few years that will make us feel a lot more optimistic," he smiled.

Metallurgists Celebrate Centennial

In June the Department of Metallurgical and Materials Engineering welcomed alumni and friends of the department to a centenary reunion. "Looking back through the old graduating records, it appears that the department awarded its first degree in metallurgical engineering in 1890. This seemed like a good opportunity to celebrate 100 years of awarding metallurgical degrees at Colorado School of Mines and an ideal excuse for alumni, faculty and graduate students to get together," according to Dr. John J. Moore, professor and department head.

Mines is currently graduating 30 to 40 undergraduates a year with a bachelor of science in metallurgical and materials engineering. This level has been relatively constant over the last few years and is all the more remarkable when one recognizes that student numbers in metallurgical and materials departments are decreasing.

"We have found a very high demand for our undergraduates over the last few years and we are extremely keen on increasing our recruitment through this program. At the graduate level we currently have 85 graduate students split between masters and doctoral programs. Over the past five years or so, 95 percent of the students in the undergraduate program and 75 percent of the graduate students who have graduated from the department have been American citizens which is remarkable since it is not uncommon for most graduate programs in the United States to have fewer than 50 percent U.S. citizens," Moore explained.

The department currently has 16 faculty who are extremely active in both research and teaching. In 1989 the faculty were successful in attracting almost \$2 million in research funding from federal, state and industrial sources, and Moore anticipates exceeding this level in the next year.

Academic programs

With a look to the future, the Department of Metallurgical and Materials Engineering has made a strong commitment to provide both undergradu-

ate and graduate programs in ceramic engineering and has broadened its role to include composite, intermetallic and advanced materials, while reinforcing its traditional strengths in metallurgy. By broadening the academic base while still maintaining the department's traditional strengths in processing materials,

Underground miners at the Homestake Mine in Lead, South Dakota



Marvin Silver ©/Homestake

a new undergraduate program is now in a transition period. Again, the emphasis is on processing materials whether they be metals, intermetallics, composites, advanced materials, or ceramics. Seniors graduating from the department in 1991 will be the first to graduate through this new program.

"We are particularly pleased with this new course curriculum with its increased emphasis on generic processing principles of materials. What is even more pleasing is the recent report from the National Research Council on 'Materials Science and Engineering for the 1990s - Maintaining Competitiveness in the Age of Materials'. The main conclusion of this report was that there needs to be more emphasis on synthesis and processing of materials at both the undergraduate and graduate levels in the United States. We feel that our new curriculum and broadened research program addresses this area of national importance," said Dr. Moore.

Research areas

The research areas can be broadly categorized into the four main research centers which operate within the department. *The Advanced Steel Processing and Products Research Center* is supported by 19 North American companies which are either steel producers or steel users. This center has been used as an ideal model in the United States for industry-university cooperative research centers. The research encompasses processing steel from cast-

ing to finished product. *The Center for Welding and Joining Research* continues to enjoy an excellent reputation with respect to the metallurgy of welding and has also extended its role in joining ceramic-metal components, ceramic components and composite materials. *The W.J. Kroll Institute for Extractive Metallurgy* is not only concerned with conventional mineral processing,

pyro, hydro and electro metallurgical extraction, but also in the chemical processing of ceramic precursors such as combustion synthesis of ceramic and intermetallic composite materials, and in recycling and environmental engineering of materials. *The Colorado Center for Advanced Ceramics* was initially established through funding from Coors Ceramics Company which has also established an endowed chair in ceramic engineering in the department. Professor Dennis Readey, who was previously department head of ceramic engineering at Ohio State University, is the first Herman F. Coors Professor in Ceramic Engineering. ▲

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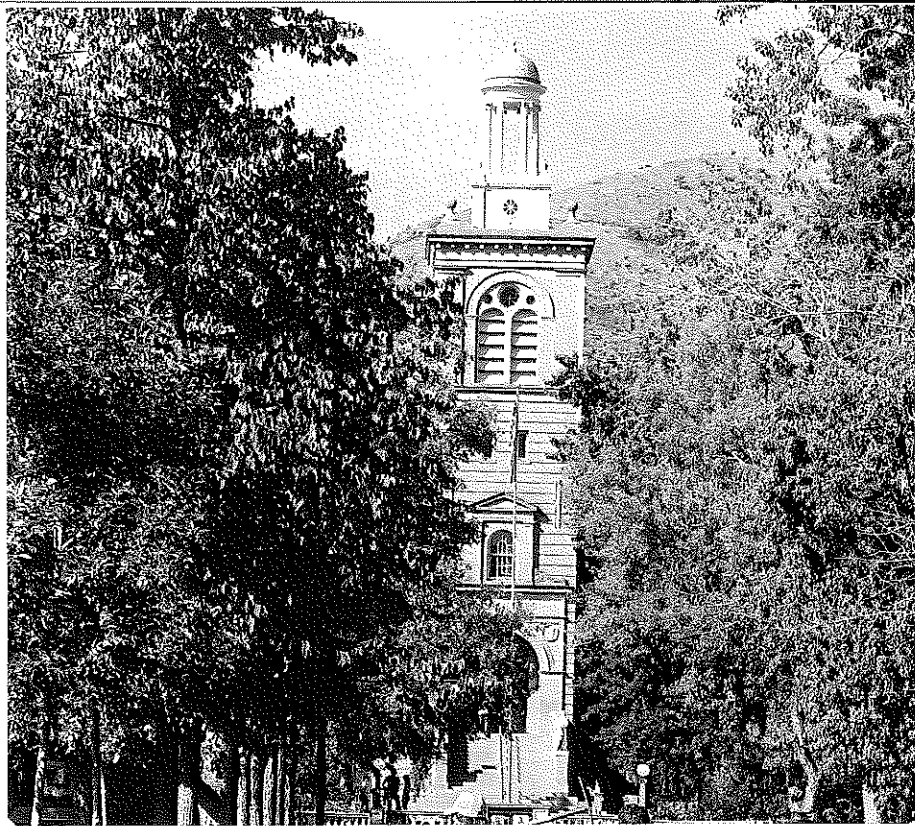
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FRIDAY, OCTOBER 19

8:00 a.m.	CSMAA Board of Directors' Meeting Open to the public.	Student Center Middleton Room	1:00 p.m.	Homecoming Game: OREDIGGERS vs. Chadron State. Tickets may be purchased at the box office. Box seats \$6; Reserved Seats \$5; General Admission/Adults \$4; General Admission/Students & Children \$2.	Brooks Field
11:30 a.m.	Annual joint Golden Chamber of Commerce/CSM Quarterback Club Luncheon; Presentation of CSM Football Team, Marching Band and the Homecoming Queen and Beast candidates. Tickets may be purchased at the door.	Green Center	4:00 p.m.	After Game Open House and Dedication of the newly renovated Steinhauer Field House. NOTE: <i>Because of the new floor; we request that you wear flat shoes and not bring food or drink inside the Field House.</i>	Field House
4:00 p.m.	Homecoming Competitive Events; Alumni are invited to participate.	Stratton Common	4:30 p.m.	Alumni Reception AFTER Steinhauer dedication, Everyone invited! 4:30-6:00 p.m.; cash bar	I-Club at the Student Center
9:00 p.m.	Noise Parade followed by bonfire and dedication of the "M"; ALUMNI INVITED!	Location to be announced			

SATURDAY, OCTOBER 20

8:00 a.m.	Student/alumni Breakfast at Buffalo Rose	Downtown Golden	8:30 p.m.	Dancing for students and alumni until 1:00 a.m. Rock-n-Roll D.J. in the cafeteria. Country Western band in the I-Club; pay at the door.	
10:00 a.m.	Annual Homecoming Parade down Washington Avenue.	Downtown Golden			
11:30 a.m.	All Alumni/Students Tailgate Picnic and Barbecue. Everyone invited. Bring your lunch or buy one for \$7.00. (No alcoholic beverages may be brought into Brooks Field area.) Tables limited; bring blanket.	Brooks Field (Student Center if inclement weather)			

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Managers' Success Lies in Training

by Ellen Glover



Consider this statement for a moment: Successful managers are those who develop their employees to the point where they can either take over the managers' jobs or are marketable for a similar position in the same industry.

Why would a manager intentionally develop employees to the point at which they would leave the organization that trained them? On the surface it may not make sense, but on closer examination it is a good plan. According to Michael Goeken, publisher of the *San Antonio Business Journal*, managers cannot develop each and every employee under their supervision at the same level of intensity, but they can discover particular attributes of an employee and work to improve on that individual's qualities.

Goeken further says that a large training budget is not necessarily what is needed to develop an employee professionally. There are many ways managers can fulfill their responsibilities.

Lucy Beale, director of the Management Seminar Series and author of *The Win/Win: The New Approach Transforming American Business and Life*, a guide to increased effectiveness in both personal and professional interactions, couldn't agree more with Goeken. Beale has consulted with both large and small businesses in Colorado over the past eight years and has found a vast need that has gone unfulfilled:

Companies need on-going, consistent and frequent training for their managers without taking their staffs out of the office for days at a time, and without breaking the budget.

Beale has seen what professional development of employees can do for organizations based upon her own experience: she graduated from the University of Colorado with a degree in chemistry during which time she was published in the *Journal of the American Chemical Society*, and she spent six years as a top computer salesperson for IBM where she was responsible for 30 small- to medium-sized business accounts.

Beale co-founded the popular Win/Win Forums, an informal means of exchanging information that started in her living room and has spread to more than a dozen cities in the western United States. What people most frequently requested was training for middle managers in industry, the same kind of training available to large companies.

"Most small businesses couldn't afford to have in-house training. They usually don't train their managers—their managers are trained on the job and hopefully they are good. If managers aren't good, things can suffer, but they don't really know how to fix a problem. The Management Seminar Series



There are between 90,000 and 100,000 firms in Colorado. Ninety-seven percent of them are small businesses with less than 100 employees. Eighty-six percent have less than 20 employees. They currently employ 52 percent of the workforce.

- Small business created 49 percent of all new jobs in Colorado in 1988.
- Small business income came to \$4.5 billion as of September 1989.
- This income ranks Colorado 34th among states nationwide in the growth rate category.

was designed to provide a full curriculum of all the things the managers need to know to be good, functional managers: professional development and enrichment, working with others, team building skills and current management trends.

"One of the biggest flaws in most business training today is that during the classes people are asked to behave differently, but they are not always given the capability of doing that because the material comes too fast. Or they go away for a week's worth of training and they come back to the same old grind—they have all these great ideas, but it's going to take a long time to integrate. That's what training is really about: not just getting the knowledge, but changing the way you resolve conflicts. It's changing the way you manage your energy," Beale explained.

Beale has assembled lectures and trainers who over a year's time present a different topic each week to participating businesses. The series is structured so one or more persons from a company can attend the breakfast meetings, and the classes are purposely kept small to encourage discussion.

"I have found that I personally have the highest retention of material when I learn a little bit each week for many weeks. So if I attend a class where I go for three hours a week for six weeks, I will learn more than if I attend a weekend workshop. It gives me time after each session during the following week to get accustomed to that material, which is a wonderful way to teach management. Management is one of those things you learn piecemeal, then you learn a little bit more and let it integrate over time," she said.

Beale gave an example from one of the lectures: group goal setting which introduced the issues and challenges that are inherent to the subject. The trainer had the audience focus on how they would personally work to change environmental situations so the subject wasn't necessarily job related. He showed the managers how to set goals as a group, how to come to a consensus and how to report as a group.

"By the time we finished, one of the women who had been attending quite regularly said, 'You know this is going to make such a big difference with the way I deal with my boss and with my department because now I have some tools with which I can begin consensus agreement. I can suggest which path to take and actually help the group come to a resolution rather than what usually happens—people walk away feeling they have been imposed upon.'"

Beale says one of the reasons that she started the Management Seminar Series is that small businesses are growing at a rate faster than most people realize. "Since 1970 the Fortune 500 firms have lost between four and six million permanent jobs. One million jobs were lost in 1980 alone when small businesses added two million jobs. Small business is really the wave of the future . . . we are seeing so many more facil-

ities in Denver paying attention to small business, for example, the Greater Denver Chamber of Commerce has a Small Business Profit Center which focuses on the needs of small businesses. That's why I think the timing for this program is so critical right now too . . . they need help just like the big businesses do to grow," she added.

Technically capable, but a managerial failure

Nationally job creation in the economy has been largely an outcome of small business activity, especially activity by firms with fewer than 20 employees. Of the 10.5 million net new jobs created over the 1980-86 period, 63.5 percent were created by firms with fewer than 500 employees, 38.7 percent by firms with fewer than 20 employees.

With the impressive statistics [in bold type above] it's easy to see how valuable a competent manager is to a small- or medium-size business. Yet start-up businesses have high failure rates (three out of five) because of inexperienced managers. Beale has observed technically capable people who have started businesses only to fail because they lack an understanding of the mechanics of running a business.

"A business can be really devastating to a technical person. I was consulting at US West and they call them 'technoids': people who are so good technically, but they are not very good with details. The mechanics of running a business aren't readily obvious to them. These are the people who desperately need management training without spending a lot of time away from their offices," she said.

WHY SMALL BUSINESSES FAIL

According to the Small Business Administration, there are several reasons why small firms fail. Ranked according to priority they include:

1. Inadequate front-end planning (no business plan, no feasibility study, no cash flow projections);
2. Insufficient capital for startup and backup;
3. Inexperienced management;
4. Wrong location, low traffic, no expansion area;
5. Inventory mismanagement;
6. Too much capital in fixed assets;
7. Poor credit practices;
8. Unplanned expansion;
9. Having the wrong attitude about work practices, handling money;
10. Inadequate records and financial knowledge;
11. Unwillingness to employ and work with a banker, accountant and lawyer; and
12. Lack of managerial foresight in personnel issues.

Beale teaches a class called "How to be a Consultant", something with which she has a lot of experience. "I tell people there are basically three factors. First, they need to know where their consultation is . . . we say 'May the niche be with you.' In other words, find the niche. Don't go out there and be a generalist because a general business consultant doesn't tend to do very well. A person who has a specific niche has a much better chance at being successful. I tell them over and over again, research that niche, make sure there is a market, and be willing to put time into developing that niche.

"It's so easy to say when we are starting a business, 'Well you know, I'm really a geophysicist, but somebody needs some other work done. It's not exactly the kind of job I want but I could make money at it.' So the consultant performs the work, but after a while they can't really grow in that marketplace because they've lost their niche.

"Secondly, it's not worth being in business if we don't get the money. People have to know how much it's going to cost to start and run the business, what kind of income they need to generate to make a living at least for the first couple of years until the business grows.

"We also talk about how you build a business and how you don't do work for free, but you give people teasers. A lot of very skilled technicians, or highly skilled sales people, forget that getting the money is what the business is about.

"Finally, the third point is called 'Get the business.' While you are going into the business of being a consultant, what you really are is a marketing person. Only after you do your marketing well can you actually do what you love to do in your technical avocation," Beale explained.

With a smile Beale added that one of the tendencies of new consultants is to get so involved in their first consulting project that they spend 40 hours a week on the project and once it is completed they are back to no business again. "You continually have to market your services," she reiterated.

Businesses like Gates, Kaiser Permanente, AT&T, RTD, American Television and Cable, Soundtrack, United Way, YWCA and government officials have found their way to Beale's door and the responses have been favorable. With the success or failure of small businesses hinging upon managers' decisions, access to current management training is essential. ▲

IF YOU WIN, YOU MIGHT LOSE

When arguing, it's often better to lose than win. An argument you win can cause you to ruin a relationship with someone important.

Here are some questions to ask before you decide to try to win the argument:

- Is my ego getting in the way?
- Is winning this argument more important than maintaining a valued relationship?
- Is the issue a priority?
- How much will I gain if I win?
- How much will I lose if I lose the argument?

Highly successful people possess the judgment to back off most arguments because those arguments are stupid and baseless, according to public relations expert Henry Rogers.

Source: *Rogers Rules for Success*, by Henry Rogers, St. Martin's Press, 175 5th Ave., New York, NY 10010.



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DEALING WITH DIFFICULT PEOPLE – A Conflict Questionnaire

Proverbs state traditional wisdom. The following proverbs and statements reflect traditional wisdom for conflict resolution. Read each carefully. Using the scale given below, indicate how typical each proverb or statement is of your actions in conflict, and in dealing with difficult people.

- 5 = Very typical of the way I act in conflict
- 4 = Frequently typical of the way I act in conflict
- 3 = Sometimes typical of the way I act in conflict
- 2 = Seldom typical of the way I act in conflict
- 1 = Never typical of the way I act in conflict

- 1. Soft words win hard hearts.
- 2. Come now and let us reason together.
- 3. The arguments of the strongest always have the most weight.
- 4. You scratch my back, I'll scratch yours.
- 5. The best way to handle conflicts is to avoid them.
- 6. When one hits you with a stone, hit him with a piece of cotton.
- 7. A question must be decided by knowledge and not by numbers (of people) if it is to have a right decision.
- 8. If you cannot make a person think as you do, make him do as you think.
- 9. Better half a loaf than no bread at all.
- 10. If someone is ready to quarrel with you, he isn't worth knowing.
- 11. Smooth words make smooth ways.
- 12. By digging and digging, the truth is discovered.
- 13. He who fights and runs away lives to run another day.
- 14. A fair exchange brings no quarrel.
- 15. There is nothing so important that you have to fight for it.
- 16. Kill your enemies with kindness.
- 17. Seek till you find, and you'll not lose your labor.
- 18. Might overcomes right.
- 19. Tit for tat is fair play.
- 20. Avoid quarrelsome people – they will only make your life miserable.

Scoring

From the scores above place your score next to the appropriate question number.

Type 1	Type 2	Type 3	Type 4	Type 5
___ 5	___ 3	___ 1	___ 4	___ 2
___ 10	___ 8	___ 6	___ 9	___ 7
___ 15	___ 13	___ 11	___ 14	___ 12
___ 20	___ 18	___ 16	___ 19	___ 17
___ Total	___ Total	___ Total	___ Total	___ Total

Now add your scores under each type. These correspond to the animals described below.

Behavior Styles

Type 1:

Turtle - Someone who wants to avoid conflict; and will give up their own personal goals to avoid a troublesome person. "I'm helpless and there is no way to resolve a situation," they say.

Type 2:

Shark - Sharks who are well fed don't need to be fed again. Feed 'em! Give them something to resolve a conflict.

Type 3:

Teddy Bear - With teddy bears the goals of a relationship are more important than personal goals—they want people to be happy. "Teddy Bear" assumes you can't discuss problems without damaging a relationship and tries to smooth over conflicts; a prevalent style among women.

Type 4:

Fox - Foxes seek compromise; and believe both sides get something through conflict resolution.

Type 5:

Owl - An owl thinks by getting into a conflict things will be better in the end. An owl will acknowledge a problem; gather data, identify mutually exclusive needs and goals, develop a plan and put it in writing—they won't stop until they have a solution.

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"Make the promises and get it done"

Small Golden business finds evolution key to growth

What started out five years ago as a software design company for a specialty audience—ranching—has evolved into a divergent company that is doing well developing and designing programs, and designing, selling and supporting networks.

Computer Aided Business Solutions, Inc. of Golden, Colorado, headed by Keith Vincent, saw rapid growth the first three years of its existence when it sold hardware. Since the company has changed its focus from retail sales to consulting and selling services and software, growth is not as rapid but still healthy.

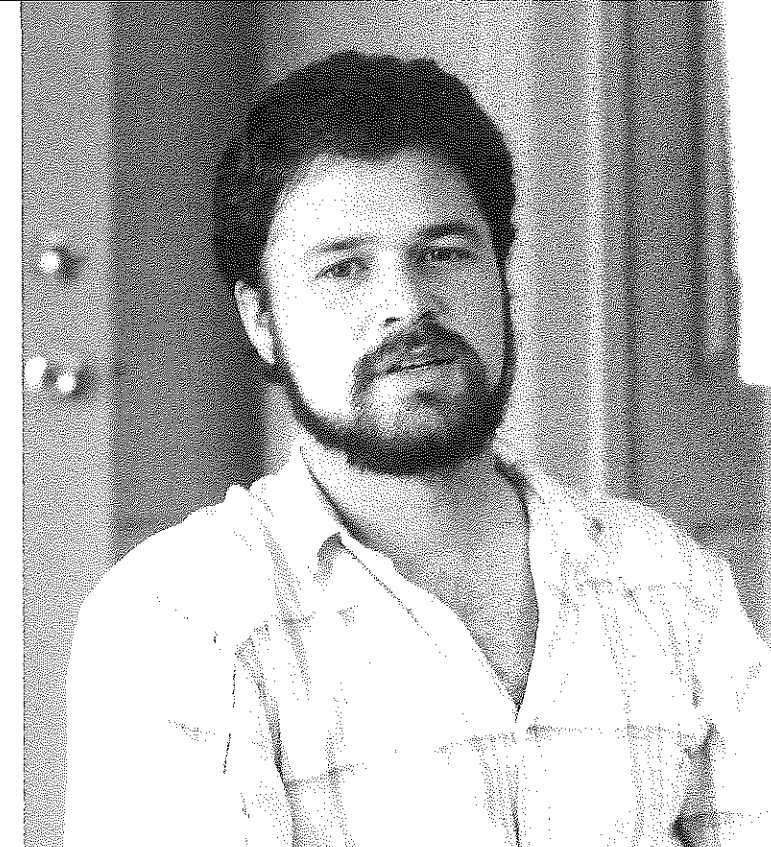
Many of Vincent's clients are in the manufacturing industry along the Front Range and use custom designed software; Computer Aided supports and installs networks for companies like Coors, Storage Tek, Mastercraft Cabinets, Kodak and other firms with Denver-based offices.

They have also released a few programs which perform a utility on a network and are starting to sell the programs to other dealers who are reselling them to customers.

Vincent, who went to Mines for 3 1/2 years in chemical engineering and math, comes from southeastern Colorado and started consulting while he was still at Mines. He still plans at some point to return to Mines and finish his degree. "Some people ask why would I get an engineering background and do this (computers), but some of the logic that is drilled into you at Mines is usable in making decisions. You can come into a business and figure where you want to go, but trying to make a plan is tough and some of the logic in solving problems is applicable.

"My experience is very useful in dealing with customers, especially manufacturing and engineering companies. I can talk on their level—you're more than the computer person, someone with a broader background," he said.

Vincent talked about some of the managerial headaches of a small business, including retaining employees; he employs 8-12 people depending upon workloads. "This seems to be a fairly hard business to keep employees around for any time. Except for two long-term employees no one else has been here for more than a year . . . it's tough. That takes the most amount of time in terms of management—keeping and training employees."



Keith Vincent, president of the company (E. Glover photo)

He may be president of the company, but Vincent finds he writes checks, does technical support, sales and occasionally even fills the pop machine. They have hired managers for the "store" before, but without much success. "I want to do the design and the programming research more than I do managing but since I really haven't had any luck hiring a manager I've pretty much decided that I will have to spend some of my time managing," he said.

By viewing the company as two sides to one coin—selling more expensive hardware and more extensive custom networks—Vincent sees a smaller volume of sales, but more involved sales. "The majority of growth has been in the development side of the company. We've just started releasing some products, going to national trade

shows and placing some national advertising for software. My hopes are that both sides will continue on their own. Part of the work is make the promises and get it done. We've been real careful not to promise what we can't get done; we've been pretty cautious which is important in this business. That's what is helping the hardware side of Computer Aided; if we were just selling computers we wouldn't be in business," he smiled. ▲



The Chilean economy boasts the world's freest enterprise system with decidedly capitalist leanings. It has performed marvelously throughout the 1980s, emerging as the fastest growing economy in Latin America, if not the Third World, while other countries have languished in galloping inflation, depression, business recession, and even near collapse of economies.

Chile's growth rate for 1989 was an impressive ten percent, three points ahead of the previous year. Its exports quadrupled through the decade, leaving this once copper-dependent economy far more diversified. Nevertheless, copper remains an economic mainstay. In 1989, Chile exported over 1.6 million tons of copper (mostly concentrates), earning US\$4.02 billion, or a half of the total \$8.1 billion in exports.

Close to US\$3 billion was invested in Chile last year, of which a whopping 53.4 percent came from United States investors. The foreign exchange reserve hovers at a healthy \$3 billion mark. Even the government produced a surplus of \$1.3 billion in 1989, an unheard of event in Latin America and a feat that all U.S. politicians could aspire to achieve.

All these economic miracles have roots in a peculiar past history, however, and there are those with purported clairvoyant vision who argue that not everything is as rosy as it seems. The problem, to be blunt, is internal politics.

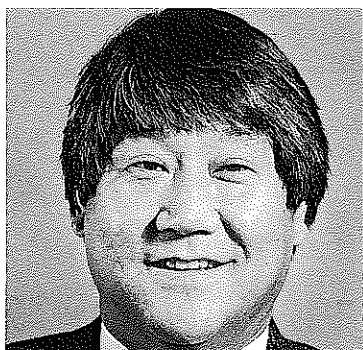
Opening frontiers: "savage capitalism"

During the second half of the last century, Chile's mineral economy began to boom, thanks to William Wheelwright, a North American railroad builder, and John William North, a British merchant-turned-miner. Farsighted risk takers like North and Wheelwright opened up the forbidding Andean frontiers which Spanish conquistadors and their heirs merely scratched. The contributions of these two international capitalists have been aptly remembered as ruthless exploitation of Chile's natural resources and precursors of generalized evils associated with "savage capitalism," a phenomenon common throughout the Andean societies with mining heritages.

Wheelwright was vilified as a "Yankee Pizarro," while the Britisher was ennobled as the king of nitrates. Other Yankee and British investors followed

The Return of Yankee Pizarros and Anglo Nitrate Kings: Chile at the Crossroads

by Dr. Eul-Soo Pang
Head of the Department of Global Systems & Cultures



them and made vast fortunes in Chile. Towns such as Iquique and Antofagasta were built with Oregon timbers

and became the faithful outpost of raw material producers who fed the emerging industrial machines of the U.S. and older economies of Europe.

But the frontier boom, the glitter of development, and the rise of towns and markets left a bitter social and political legacy: workers without limbs (victims of mining accidents), greedy merchants, ruthless foremen, equally repressive priests, and arrogant expatriates living in fish bowl compounds. They all became prey to the boom and bust cycles of the mining economies. This legacy was the bitter fruit borne of a free market enterprise system and unbridled international capitalism. The first encounter with the post-industrial age development of mineral economies in the Andes engendered a deep mistrust of capitalism and its attendant social and political systems that fueled xenophobia.

As late as the 1960s, the country's mineral wealth was solidly in the hands of North American companies—Anaconda, Kennicott, and Cerro together producing as much as 80 percent of Chile's copper exports. The captains of Chilean industry, banking, and mining were all foreigners. In 1970, 100 U.S. corporations operated in Chile and 24 of them—all Fortune 500 giants—dominated the non-agricultural sectors of the economy. Lands, both agricultural and pastoral, belonged to the tightly knit upper-class, commonly known as "the oligarchy." Reform-minded Christian Democrats in the '50s and '60s, fearful of the revolutionary Marxism replacing the existing order, made feeble attempts to introduce sundry reforms including the "Chileanization" of the copper industry. This meant that 51 percent of the natural resources and assets had to belong to Chileans, while foreigners had to confine themselves to being minority shareholders.

Country crumbles under economic reform

In the 1970 election, the foreign ownership of properties, land reform, unionization of workers, higher taxes,

and bigger social entitlement programs for the poor became the key issues. Chileans elected by a narrow margin a Marxist as their president. Within three years, the economic reform—or to some, the Allende revolution—left the country in shambles and with bitter political acrimony among groups and parties of various philosophical persuasions. The military intervened in a classical Latin American praetorian tradition and swiftly restored the pre-1970 social order with vengeance. But the junta did not seek to undo everything that the Allende regime had wrought, however.

Both U.S. policy makers and businessmen give credit to the Pinochet regime and its economic planners for dismantling the socialist system and introducing the freest market economy in the western hemisphere, including the United States. Of the 507 state-owned enterprises created and operating during the Allende rule, the Pinochet regime divested all but 13. Among them are the world's largest copper mining company (Codelco), the country's chief refiner and smelter (Enami), a development financing company (Corfo), a petroleum monopoly company (Enap), and others. Banks, insurance companies, utilities, railroad, bus lines, airlines, and shipping companies are all privately owned. In other words, Pinochet chose to keep those socialist enterprises that suit the purpose of Chile's resurgent free market interests.

In March 1990, Patricio Aylwin, a Welsh-Chilean, was sworn in as the first civilian president freely elected in two decades. A Christian Democrat by conviction and a political helmsman of over a dozen party coalitions, Aylwin has made a commitment to retain the macroeconomic policies of the Pinochet regime while making microeconomic adjustments (read "finding ways to pay for the social debt") to transfer more of the national wealth to the poor and working classes. Aylwin, too, chose to keep parts of the Pinochet economic system that has produced wealth for the country, however.

Will reforms scuttle winning formula?

It is the deep mistrust of international capital that both the right wing

general and the Christian Democrat politician harbor which prompted them to retain key state enterprises and state intervention mechanisms as the national counterweight to the free market capitalist system now in full swing. The president and his advisers are determined to implement basic reforms in the economy and society that could scuttle the winning formula, if Aylwin cannot contain excesses of the left and the right. The tax reforms, revisions in the labor code, and pro-working class social programs could dilute the current international confidence in Chile as the world's best mining investment ground.

The deeds of the president during the first months in office indicate that he means to stay the course by keeping the macroeconomic policies of the Pinochet regime with a few salient changes. Aylwin suspended privatization after critics argued that Chile was divesting valuable assets at a steep discount price of 50 percent or lower. The president also reaffirmed his intention in maintaining and building up the existing state-owned enterprises, mostly in the mining and energy sector. And the Central Bank of Chile, now an independent entity, will restrict the use of debt-equity swaps as an instrument of investment. Finally, in mid-May, after two months of bargaining among the ruling and opposition parties, the government raised the minimum wage from 18,000 to 26,000 pesos (roughly US\$66, or a 43 percent raise).

Investigating human rights

Civil-military relations is one major political concern and its outcome could hold a key to the stability of the new democratic government. General Agustín Pinochet made several fixes, while in office, to protect the military and its corporate interests. These fixes are now coming unglued. Aylwin established the Commission for Truth and Reconciliation to investigate human rights abuses since 1973. The obvious target is the army. The nine-member commission has six months to establish a slate of charges against army officers who violated human rights during these past 16 years. His decision is popular but Aylwin is in a quandary: the Argentine

style of going after the violators will provoke the army. This in turn could result in sympathy support from the navy and air force, that is, a possible reaction from the armed forces against the government.

The Brazilian precedent of sweeping the past military sins (and to some, crimes against humanity) under the rug will not be tolerated by the decent citizenry. The Argentine-style justice of packing off junta members (generals, admirals, and brigadiers) to jail will not be easily embraced by the armed forces and their civilian supporters. The impatient left—the communists failed to elect any national congressman during the last election and hence are without a political channel to register their demands—are drifting dangerously at the fringes of the political arena. Already, one former junta member has been shot and the former national police chief was assassinated. Currently the commonplace crescendo of urban violence in Santiago and other cities, much of which is politically motivated, has caused serious concern among government and civic leaders.

Coffers from copper—

Never in history has the country benefitted from God-sent opportunities to build its economy. The price of copper has remained high while other key producing countries are suffering from severe domestic problems. Guerrillas have closed down mines in Papua New Guinea. Inefficiency and ridiculously high costs of production are crippling the copper sector in Zambia. Political corruption and outright thefts of the public treasury are rife in Zaire. These events have favored Chile as the world's most productive and efficient copper economy.

About three-fourths of Chile's copper is produced by Codelco; the rest is by small- and medium-sized domestic and foreign firms. Outmoded production methods, overstuffed personnel system, and the aging labor force have made the state copper monopoly less competitive, but this is of no major concern. The private sector, including Chilean, U.S., European, and Asian firms, can easily take up the slack. The less-efficient Codelco will be forced to consider joint ventures and co-financing ap-

proaches with private sector companies more seriously, thus opening up the tightly clenched monopoly of the copper economy. Already, such U.S. firms as Homestake, Amax, Chevron, Exxon, Cyprus, and others are key players in copper, gold, lithium, and other minerals. No less ubiquitous are Australian, Japanese, British, South African, Korean, Canadian, and New Zealand investors.

It is highly unlikely that even if the current political situation deteriorates, Chile will go back to 1970. No longer is the U.S. the monopoly capitalist, although its share of investment is overwhelming by any standards and is growing. Nevertheless, there are too many countries which have stakes in Chile's stable democracy and market economy. By coincidence, Chile's political and economic future is a double-edged sword: unlike in 1970, the country no longer enjoys autonomy in political, economic, and social decision making without taking into account potential fallouts from outside investors and markets. Also, it must convince its 13 million citizens and the international community that the commonwealth of the nation and consumers of Chilean goods is the one and the same.

Chile is on an unprecedented economic "roll" and must find ways to keep the momentum while it searches for viable political and social alternatives to the Pinochet legacy which has brought back the specter of the Yankee Pizarros and British nitrate kings of the fin-de-siecle. The only difference between the two ages is not just that of time. The complexity of the present global systems of finances and natural resources leaves less and less room for Chile and international investors to maneuver. Chile and its global partners cannot afford to flounder economically in a sea of xenophobic nationalism like Argentina and Brazil. Nor can it afford to drown in a wave of international capitalism. ▲

Homecoming
OCTOBER 20, 1990



SECTIONS

WESTERN AUSTRALIA

Norm Zehr received the following fax on May 30 from Andrew Extract '76 in Western Australia "One group of CSM graduates couldn't get much further from Golden, Colorado unless they were in a boat. Perth, Western Australia was the venue for a luncheon meeting of Miners from around the state on May 25, 1990—the final day of the West Australian Mining Exposition.

"In attendance were Al Sabitay '53; Richard Stallings '55; Dick Self '56; Andy Lebel '61, '71; Paul Lewis '66; David Spottiswood '70; Tom Gibson '74 and his wife Sue; Andrew Extract '76 and his wife Maria; Mike King '78; and Virgie Goodgame '87.

"Some other Miners located in the state who were unable to attend are Dave Wilkie '75; John Turney '79 and Vicky Turney '82.

"We understand that Doug Halbe '61 will be returning to Western Australia in the near future and we look forward to including him in our next gathering which is tentatively scheduled for October or November. A tour of a Greenbushes operation in the southwest of the state is being organized for that meeting.

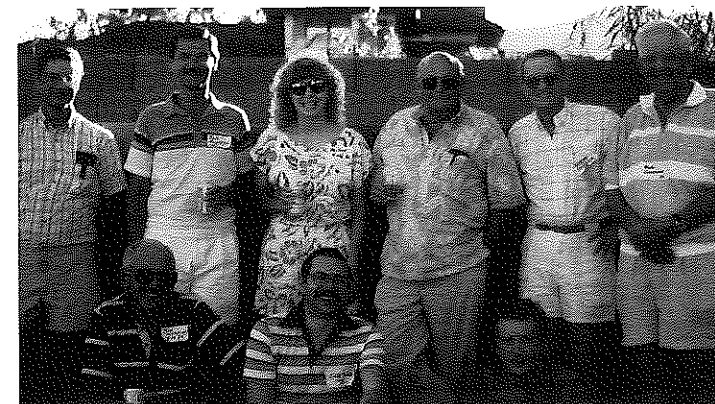
"Considering that the state of Western Australia has an area roughly equivalent to one third of the continental United States, getting 10 out of the 13 known CSM graduates in the west to attend is a significant achievement.

"Contacts and/or information about future meetings can be made through consulting mining engineer and luncheon organizer Paul Lewis on +6-9-361-0355," Extract said.

We hope to hear again from our "Australia Connection"—perhaps even a photo or two. As Norm wrote Andrew, "It always takes just one or two people to make these things move. . . ." Sounds like we have some movers and shakers in Western Australia. Andrew and Paul Lewis '66 encourage other alumni in their area to contact them.

PHOENIX

Dick Richards '62 and his wife, Rhea, hosted nine Colorado School of Mines Phoenix area alumni and their spouses



Phoenix Alumni:

Left to right, front row: Warfield, Pollock, Richards; back row: Johns, Monchak, Kogl, Lee, Conder, Comstock.

at a picnic at their home in Ahwatukee on June 3.

Dick writes that "those attending included Robert Comstock '41 and his wife, Mary; Steve Conder '51 and his wife, Margie; Henry (Hank) Johns '66 and his wife, Bonnie; Michele Kogl '86 and Kevin Conry; Al Lee '50 and his wife, Carolyn; Tom Monchak '70, '74; Cliff Pollock '72; and Tom Warfield '52 and his wife, Bobbie.

"Johns is employed by IMSAMET; Kogl by Maricopa County; Pollock and Richards, Western Technologies Inc.; and Monchak by DMJM. Comstock, Conder, Lee and Warfield are all on the retired list.

"Billed as 'the first Colorado School of Mines Phoenix Old Man Olympics', the afternoon affair included horseshoes, pool, ping-pong and swimming, as well as good fellowship, food and drink. Richards (the kid), after an intense struggle, beat Comstock (the old man) in the ping-pong championship. However, 'the old man' and Lee (almost the old man) were the horseshoes champs, for sure."

The Phoenix section will be planning future meetings including one in Sun City in November. If you would like to be on their mailing list, please call Dick at work, (602) 437-3737 or at home, (602) 496-0817.

HOUSTON

The Houston section, a very active group, met June 14 at the Houston Engineering & Scientific Society.

Coordinator Chuck Russell '54 writes that the following alumni attended: John Cloeter '58; Bart De Laat '30; Tom Kellett '66; George W. King '42; Dave

Lee '59; Jim Murphy '50; Steve Rasey '78 and Carlos Rolandelli '89. (We were pleased to see Bart De Laat and Jim Murphy on campus reunion weekend.)

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

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DOWNTOWN DENVER

Twenty-three alumni and guests met for breakfast June 26 at the Holiday Inn Downtown. Dr. Phil Romig, head of the geophysics department, spoke about the Center for Exploration Geoscience Computing and the initiative between IBM and CSM.

Guests included Mike Decker '77; Gene Gaz '73; Steve Harpham '83; Tim Hoops '79; Gary Hutchinson '62, '89; Ron Lestina '50; R. Mike Loeb '51; Brian Macke '80, '88; Pat Phillips '61; Claudia Rebne '84; Fred Schwartzberg '53; Michael Shade '79; Lee Shannon '83; David Wheeler '86; Jim White '64; and John White '66. CSM staff members Ann Fay and Jenifer White and alumni staff members Laura Robinson and Mary Jo Giddings also attended.

Co-coordinators Steve Sonnenberg '81 and Chris Oglesby '80, announced that the new downtown Denver section leaders (effective in September) would be Claudia Rebne '84 and Roger Hutson '82. Claudia and Roger already have some good ideas for next season's speakers and we look forward to working with them.

Steve and Chris have done a super job the past two years coordinating this section and we are most appreciative of their excellent leadership.



Dr. Steve Sonnenberg (left) and Dr. Phil Romig at Denver downtown section.

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.

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

UNDER THE 'M'

CSM SUMMER MINORITY ENGINEERING TRAINING PROGRAM OBSERVES 20TH ANNUAL SESSION

A generation ago, when Colorado School of Mines Professor Dale Foreman became aware of the absence of minority students enrolled in the nation's engineering schools, he realized something had to be done.

So in 1970 Foreman established the CSM Summer Minority Engineering Training Program (SUMMET), an intensive course designed to introduce female and ethnic minority high school sophomores and juniors to careers and educational opportunities in engineering.

Twenty years later SUMMET is still going strong at CSM. The four-week 1990 session, (June 17 to July 13) hosted more than 55 high-potential minority students from around the nation.

The program focused on a rigorous introduction to pre-engineering problems in mathematics, earth science and computer science. Several field trips, including two days of climbing and rappelling at Camp Hale near Leadville, punctuated the classroom work. Supported by industry sponsors, SUMMET is free to participating students.

"The first year of SUMMET we had just 12 students. We just barely had

enough money to buy our supplies and operate," Foreman recalled. "After that we rocked along at about 20 to 25 students for the next 10 or 12 years."

Now a professor emeritus, Foreman not only recruited the students, but personally visited local industries seeking support for the program.

"Mostly it was a lot of small, local companies that came through and got this started," he said.

Gradually, the program grew. Beginning in 1987, a series of \$50,000 annual grants from Arco helped CSM establish a Minority Engineering Program and double the number of students attending SUMMET. Other current sponsors are Amoco, Exxon, Marathon Oil, Mobil, Rockwell International, Shell Oil, U.S. West, Dupont and Hewlett Packard.

"The motivation behind SUMMET is to encourage minority students to consider careers in earth science and engineering, but one of the fall-out benefits is that about 25 percent of the SUMMET students end up enrolling in the School of Mines," said CSM Minority Engineering Program Coordinator Don Velasquez.

Partly due to SUMMET and the school's other minority outreach efforts, CSM has increased its minority enrollment and graduation rates over the past several years. Ethnic minorities now total nearly 10 percent of the CSM undergraduate student population, while the percentage of bachelor's degrees awarded to minority students has more than doubled since 1987.

Gentry Named Head of CSM Department of Mining Engineering

Dr. Donald W. Gentry has been named head of the Colorado School of Mines Department of Mining Engineering.

Formerly dean of engineering and undergraduate studies, Gentry led the School's academic departments in numerous successful initiatives including curriculum revisions and establishment of the Department of Global Systems and Cultures. His reassignment comes as a result of the discontinuance of that office.

Gentry brings a wealth of experience to the mining department. His national reputation, leadership skills and knowledge of the mining industry promise to ensure that the CSM mining department remains among the best of its kind in the world.

Gentry replaces Miklos Salamon as department head. Salamon resigned to return to full-time teaching and researching.

Homecoming

OCTOBER 20, 1990

August, 1990

Dear Alumni,

Howdy, folks! We'd like to take this opportunity to introduce ourselves as the Homecoming 1990 co-chairmen. Our committee has been working hard to make Homecoming 1990 an event to remember!

To kick off an exciting Saturday, we will start with a breakfast buffet at Buffalo Rose Restaurant. Next join us in downtown Golden for the longest ever Homecoming parade.

Join in the fun and head on down to Brooks Field for the student and alumni tailgate picnic and barbecue. (Bring your own lunch or buy one there.) Then celebrate the 101st year of football at the Mines Orediggers vs. Chadron State Eagles (Nebraska) homecoming game.

Then, just when you thought the fun was over, meet us at the newly-renovated Steinhauer Field House for its dedication.

Lastly, put on your dancing shoes and top off the day with a rock-n-roll D.J. in the cafeteria and a live country-and-western band in the I-Club.

We're looking forward to a sensational homecoming this fall and we can't wait to see you there! Make your reservations NOW! See the ad on page 12.

Sincerely,

Laura S. Strange, CPR 1992
Trina York, Met. 1992

Schlumberger Foundation Gift Boosts Students, Departments at CSM

The Schlumberger Foundation has presented Colorado School of Mines with \$12,000 in Schlumberger Collegiate Awards to help support the studies of two undergraduate students and to enrich the school's engineering and geophysics departments.

The Department of Engineering and the Department of Geophysics will each receive a \$6,000 foundation gift to be shared with an outstanding student. Each student will be awarded a \$3,000 scholarship. The departments may use the remaining money for laboratory equipment, faculty development or additional scholarships.

Senior geophysics major Jeffrey Suiter and junior engineering student James Ireton have been selected to share in the Schlumberger grants during the coming academic year.

The scholarships are based on merit, with no restrictions regarding financial need, race or sex.



AMOCO/CSM PARTNERSHIP GOING STRONG IN '90

A longtime partner in higher education with Colorado School of Mines, Amoco will step up its annual support to the school by 20 percent in 1990.

This year Amoco will provide \$136,000 to CSM for a variety of programs, ranging from development of a computer laboratory to an effort to encourage secondary school students to pursue a career in the geological sciences. Last year's contribution total was \$113,000.

Among its gifts, the company has slated \$25,000 for continued funding of the CSM Center for Potential Field Studies, a consortium studying new methods of petroleum exploration.

Amoco has also dedicated \$10,000 for operating expenses of the Department of Geology and Geological Engineering's year-old computer laboratory, a facility designed to help integrate

modern computing techniques into geologic education and research.

An additional \$6,000 gift from Amoco has funded the beginnings of the geology department's Geology and Geological Engineering Information Program, in which CSM geology students have volunteered to visit area high schools to describe career and educational opportunities in diverse earth science fields. Students in the program will cover topics such as petroleum and mineral deposit geology, hydrogeology, environmental and contaminant management and geotechnical engineering. Career opportunities in these fields are projected to exceed the number of qualified graduates during the coming decade.

"Amoco has taken the initiative in helping us introduce these innovative programs and in developing support from the petroleum industry," said CSM Department of Geology and Geological Engineering Head Sam Adams.

Amoco's support of education extends from the CSM campus to its Denver facility. CSM Professor John Warne is teaching a course on sequence stratigraphy to more than 40 of Amoco's technical staff.

In addition, Amoco supports the studies of five CSM students: two doctoral, two master's and one bachelor's degree candidates. The company has earmarked \$25,000 for environmental training programs and supports an assortment of smaller projects at the school.

CSM Hosts American Indian Math Camp

Colorado School of Mines hosted "American Indian Young Scholars Early Alert," a three-week math camp for American Indian middle-school students June 25-July 13.

Thirty high-potential sixth- through eighth-grade American Indian students attended the camp, which is designed to instruct and encourage the students in mathematics, science and the use of computers, while introducing them to the college environment.

Students built and launched rockets, used LOGO computer programming to construct graphic designs and completed a math/science project.

"The idea is to get the students really excited about math and science so they'll stay in school," said Ardel Boes, head of the CSM Department of Mathematical and Computer Sciences.

Boes and CSM Assistant Professor Barbara Bath secured a two-year, \$108,000 National Science Foundation grant to finance the program. The camp ran concurrently with a teaching enhancement program for teachers of American Indians. Teachers and students attending the program are from the same schools, making follow-up activities possible during the academic year.



1990 Oredigger Football Outlook

Colorado Mines Orediggers showed continuous improvement during 1989 and return enough seasoned veterans to have a chance to convert the knowledge gained last year into a successful 1990 football campaign.

In 1989, CSM celebrated its 100th season of college football, was featured weekly on Cable News Network's college football preview show, honored past players at each home game, and finished the season with an appearance in the Aztec Bowl in Mexico City. Not too many 2-8 teams can claim that much notoriety.

Now Coach Marv Kay, entering his 22nd season as CSM head coach, hopes the on-field and off-field experience has matured his team sufficiently to demonstrate gains in the win column during 1990.

He bases his optimism on the return of 38 lettermen including eight starters back on both offense and defense. He also welcomes back 22 redshirt freshmen.

"On offense, we return all our receivers, most of our running backs and should have a good battle at quarterback with two veterans and two redshirt freshmen back. Our line has fairly good experience, we started two freshmen a year ago, and all of them are working hard during the offseason in the weight room.

"Defensively, we have starters back along the line, at linebacker and in the secondary. Our line will have fairly good size, we have eight linebackers with experience but will be young in the secondary."

In fact, CSM will be a young team with five of the offensive starters returning being only sophomores as are three of the defensive returning starters.

Tempering the enthusiasm is the need to improve the passing game. "If we can't improve on throwing the ball with more consistency, we'll be in trouble moving the ball. We also need to get better at stopping the pass on defense, not only in the secondary but also in rushing the passer."

1990 Oredigger Football Schedule

Sept. 1	Rocky Mountain (MT)	Golden	1:00
Sept. 8	Hastings (NE)	Golden	1:00
Sept. 15	Doane (NE)	Doane	1:00
Sept. 22	Michigan Tech	Golden	1:00
Oct. 6	Western State*	Golden	1:00
Oct. 13	Fort Lewis*	Durango	1:00
Oct. 20	Chadron State (Homecoming)	Golden	1:00
Oct. 27	Mesa State*	Grand Junction	1:00
Nov. 3	Adams State*	Golden	1:00
Nov. 11	Colorado College	Golden	1:00

*RMAC Games

1990 Oredigger Soccer Schedule

Sept. 1	at College of Southwest	2:00
Sept. 2	at New Mexico	11:00
Sept. 11	Regis	4:45
Sept. 15	Metro State	1:00
Sept. 21	Green Mountain (VT)	4:45
Sept. 23	Marian (WI)	11:00
Oct. 3	UC-Colorado Springs	4:45
Oct. 6	at Colorado College	2:00
Oct. 9	at Regis	4:00
Oct. 13	at Southern Colorado	2:00
Oct. 18	at Colorado Christian	4:00
Oct. 21	Scranton (PA)	11:00
Oct. 27	Westminster (UT)	1:00
Oct. 30	at Denver	2:00

1990 Oredigger Volleyball Schedule

Sept. 5	at Metro State	7:30
Sept. 7	Colorado College	7:00
Sept. 14	at UC-Colorado Springs Tourney	
Sept. 15	at UC-Colorado Springs Tourney	
Sept. 21	at Fort Lewis RMAC Tourney	
Sept. 22	at Fort Lewis RMAC Tourney	
Sept. 25	at Air Force	7:00
Sept. 28	UC-Colorado Springs	7:00
Sept. 29	Western State	10:00
Oct. 1	Denver	7:00
Oct. 5	at Western State	7:00
Oct. 6	at Mesa State	3:00
Oct. 9	Adams State	4:30
Oct. 11	Fort Lewis	7:00
Oct. 13	St. Mary's (MN) at CC Tourney	
Oct. 13	Concordia (MN) at CC Tourney	
Oct. 19	at Fort Hays State RMAC Tourney	
Oct. 20	at Fort Hays State RMAC Tourney	
Oct. 22	at Southern Colorado	

CSM is offering an all-sports season pass at \$50 (\$25 for CSM faculty and staff). The pass entitles the bearer to admission to all CSM home athletic contests for the 1990-91 academic year. Individual game tickets are also available for the 1990 football season.

For ticket information, call 273-3360, between 8 a.m. and 5 p.m., Monday through Friday.

Blaster (donkey logo)

1990 CSM FOOTBALL TICKET ORDER FORM

Date	Opponent	\$6 reserved Chairback	\$5 reserved	\$4 General Admission	\$2 Children 12 & Over
Sept. 1	Rocky Mountain	_____	_____	_____	_____
Sept. 8	Hastings	_____	_____	_____	_____
Sept. 22	Michigan Tech	_____	_____	_____	_____
Oct. 6	Western State	_____	_____	_____	_____
Oct. 20	Chadron State (Homecoming)	_____	_____	_____	_____
Nov. 3	Adams State	_____	_____	_____	_____
Nov. 10	Colorado College	_____	_____	_____	_____
TOTAL TICKETS ORDERED		_____	_____	_____	_____

ALL-SPORTS SEASON PASS:

Please send me _____ all-sports passes at \$50 each (\$25 for CSM faculty and staff)

TOTAL AMOUNT INCLUDED _____
My check is enclosed, made out to the CSM Athletic Department. Please send tickets to:

Name _____
Mailing Address _____ City _____ State _____ Zip _____

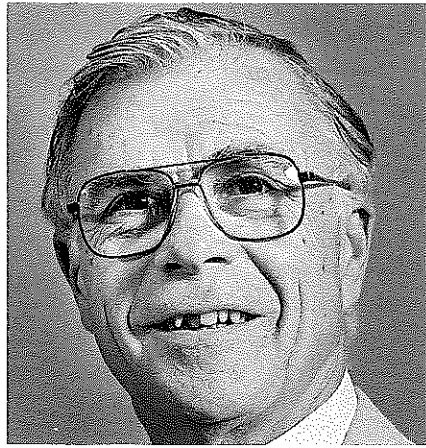
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MORSE TO RETIRE AS AMI DIRECTOR

Headquartered at CSM, AMI manages four research centers at Colorado research universities. The centers are the Amorphous Materials Center and the Engineered Materials Processing Center located at CSM, the Polymeric Materials Center at Colorado State University and the Center for High-Speed Electronic Materials at the University of Colorado at Boulder. "We've been fortunate in developing good relations between the four schools and coordinating materials research activities," Morse said. "And we've had success in bringing industry into the program."

After leading the Advanced Materials Institute (AMI) to a 16-fold increase in annual industry contributions during its first five years, Colorado School of Mines Research Professor Jerome Morse has retired as AMI director.

Morse, a CSM faculty member since 1976, was named director of AMI when the institute was founded in 1984. AMI is a program of the Colorado Advanced Technology Institute, a state-funded effort to foster university/industry collaboration and economic growth in Colorado.

CSM Metallurgy Professor Bill Copeland took over as AMI head when Morse stepped down June 30.

"Dr. Copeland has some very interesting ideas, and will take the institute in new directions. He is the right man to take it over," Morse said.

In the five years since AMI was founded, industry investment in Colorado university research has jumped from \$60,000 to more than \$1 million annually. For each dollar of state funding provided to the program, AMI has generated \$7.50 from industry partners.

Morse will remain active as a research professor of physics at CSM, where he teaches and manages a research contract in superconductor technology.

CSM Professor Emeritus Chosen AAPG President-Elect

Colorado School of Mines Professor Emeritus Robert J. Weimer has been named president-elect of the American Association of Petroleum Geologists.

Weimer will take over as president-elect July 1 and, after completing a one-year term in that office, will assume the association presidency in 1991.

Weimer, who has taught geology and geological engineering at CSM since 1957, is highly respected in the field of resource exploration. He is a

past recipient of numerous honors, including the AAPG Sidney Powers Medal, the American Institute of Professional Geologists' Ben H. Parker Medal and a University of Wyoming Distinguished Alumni Award.

He has been awarded both the George R. Brown Medal and the Mines Medal by CSM.

With a membership of more than 35,000, the AAPG is the nation's largest geological organization. The association

Placement Totals 88.5 Percent for 1989-90 BS Graduates

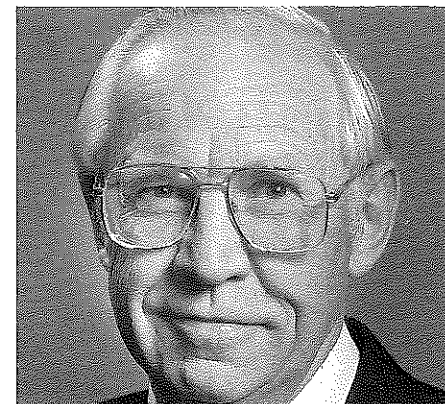
The CSM Placement Office reports that 88.5 percent, or 252 of 285 graduates, are placed as of May 29. This figure accounts for those who earned BS degrees from CSM over the 1989-90 academic year. It also represents an 8 percent increase over the number of 1988-89 BS graduates who were placed this time last year.

"Placed" means that students have found jobs in industry or government, are in the military, have entered graduate school, have returned home to a foreign country for employment, are not currently seeking a position, or are still looking for employment.

Of the 1989-90 BS graduates, 64.6 percent took entry-level jobs in industry (in 1988-89, 48.1 percent of the school's 291 BS graduates accepted industry positions), 2.5 percent accepted government jobs (2 percent), 3.2 percent entered the military (5.5 percent), 9.1 percent will attend graduate school (10.3 percent), 9.1 percent will return to their native countries (14.8 percent), and 11.5 percent are either not looking or still looking for employment (19.2 percent).

Average starting salaries for BS graduates jumped from \$30,553 in 1988-89 to \$33,197 this year, an 8.7 percent increase.

Those who held a BS in mining were in strong demand this year, with 15 interviews per student. Chemical engineering graduates also had 15.5 interviews per student, while mechanical engineering had 13.8 interviews per student, according to Placement Office reports. (See related story on page 5.)



Robert J. Weimer

is dedicated to the exploration for and production of mineral energy resources.

Charles Boettcher Distinguished Chair Established at CSM

Colorado School of Mines has received a \$500,000 Boettcher Foundation challenge grant to establish the Charles Boettcher Distinguished Chair, an endowed professorship in petroleum geology.

Under the terms of the grant, CSM has two years to raise \$1 million in addition funds, creating a total endowment of \$1.5 million in support of the chair. The school has formed a committee of prominent alumni to help raise the necessary revenue.

The holder of the chair will teach and conduct research as part of the CSM Department of Geology and Geological Engineering, as well as participate in related CSM initiatives such as the Institute for Energy Resource Stud-

ies and the Center for Exploration Geoscience Computing.

Petroleum geology is a key discipline through which CSM can help American industry increase the efficiency of the exploration process and remain competitive in the global energy market.

"Colorado's petroleum industry will benefit from the ongoing research this endowment will allow," said CSM President George Ansell. "There is a need in this country to significantly increase our ability to recover more petroleum from known fields and to discover new fields by more accurately predicting subsurface geology."

Similar Boettcher grants were also recently awarded to Colorado State University and the University of Den-

ver for endowed chairs at those institutions. A Colorado organization dedicated to supporting educational, cultural and community institutions, the Boettcher Foundation has made contributions in excess of \$100 million since its founding in 1937.

Boettcher Foundation funds are intended for use within the state of Colorado.

"We believe endowed professorships encourage research and instruction that enhance Colorado's ability to compete in the global economy," said William A. Douglas, president and executive director of the foundation. "Investing in our universities results in renewed economic vitality for Colorado."

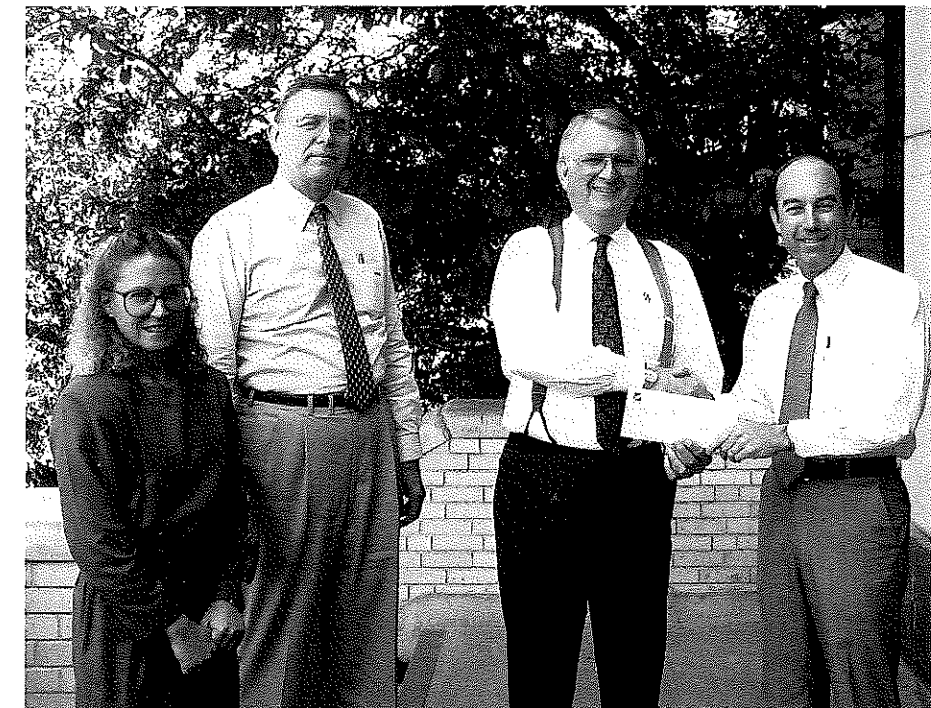
Mines Receives \$3 Million Keck Foundation Grant

The W.M. Keck Foundation recently presented Colorado School of Mines with the first installment of a three-year, \$3 million grant to support the school's Center for Exploration Geoscience Computing.

Foundation representatives were at CSM June 27 to award a \$1 million check, to be used primarily for renovating the campus facilities that will house the newly-established research center.

Subsequent funds to be provided by the foundation will include \$1.5 million to endow the W.M. Keck Foundation Distinguished Chair in Exploration Science, a permanent position for distinguished visiting professors, and \$500,000 to support the center's initial research and educational programs.

The Center for Exploration Geoscience Computing was established in November 1989, to combine CSM's expertise in the earth sciences with advanced computer technology provided by IBM. The center is dedicated to fostering a modern, multidisciplinary approach to resource exploration.



Oryx Energy Company of Dallas, Texas gave the Mines Petroleum Engineering Department a gift of \$12,000 as an unrestricted grant and \$2,000 for undergraduate scholarships. Making the presentation to Dr. Craig Van Kirk (right) is J.E. (Jim) Roberts, vice president of production. Also present from Oryx were Nancy Roberts Sabr '82, an operations engineer, and Philip T. Wall, director of production technology. (E. Glover photo)

Mineral Economics Department Presents Coulter and Risser Awards

The William Jesse Coulter Award, created two years ago to honor the graduating student in Mineral Economics with the best academic record, was presented to Tony Wayne Church for his outstanding performance in the Mineral Economics Executive Program. Church, who completed the demanding 16 month program with a perfect 4.0 average, works as a petroleum exploration geologist for the Chevron Corporation. He received \$500 and a personal plaque. In addition, his name will be placed along with those of former recipients of the Coulter Award on a plaque that hangs in the department's offices.

Church received his undergraduate degree from Yale University in 1978. Before joining Chevron in 1981, he was a minerals exploration geologist with Kerr-McGee. He is married and has three children.

Richard A. Winters has been selected by the faculty of the Mineral Economics Department for the 1990 Risser



Dr. John Tilton (center) head of the Mineral Economics Department presents Tony Church (left) and Richard Winters with plaques commemorating their mineral economics awards. (E. Glover photo)

Award. Winters was selected for his outstanding performance in the Mineral Economics Graduate Program, for his professional potential and promise, for his leadership, and for his demonstrated ability to apply the principles of economics to the mineral industries.

Winters entered the Mineral Economics graduate program two years ago. A good example of the quality of his work is his project on gold prices

that he wrote for Professor Thomas Kaufmann. The paper, subsequently revised and co-authored with Professor Kaufmann, has been published in the peer-reviewed journal *Resources Policy*. Winters served as the president of the graduate student association in mineral economics, and was recently re-elected to that position for next year. As the recipient of this year's Risser Award, he received \$300 and a plaque.

To the classes of 1939, 1940 and 1941:

An hour-long VHS tape was made of the 1939 football team reunion during Homecoming 1989, and another similarly long tape concerning Spring 1990 commencement reunion, where silver-on-gold certificates were presented to members of the class of 1940, and Ralph Hennebach received an honorary PhD. Between the two reunions approximately 50 copies of tapes were mailed out to people who ordered them to review the activities, friends, and local scenes. Both of the reunions are now on one two-hour tape.

Paul Fillo is making his copy of the reunions available to those who would have liked to have been there but couldn't make it. Consequently, if you are interested in borrowing the tape for a week and then sending it on to the next person, the Alumni Association will place your name on a list. The last name will be Paul Fillo, so he can get his tape back. You can make copies of this tape, but the original, and not the copy, must be sent on. To place your name on the circulation list, write CSM Alumni Association, P.O. Box 1410, Golden, Colorado 80402.

In addition to the recent reunions, Chuck Grimes '40 took a well-organized half hour movie in 1940 of life at Mines; campus, classes, labs, 1939 football, Senior Day, Mesabi Senior Trip, and graduation. This has been transferred to another video tape, a copy of which would be sent around with the reunion tape. It is an invaluable review of "how we were", and shows the gleams in the eyes of those venturing on into life.

If you would prefer, both tapes can be ordered for \$25, or if you already have the reunion tape, the Grimes tape can be ordered for \$12 from the Alumni Association. For more information call 303/273-3295; or Toll free inside Colorado: 1-800/245-1060, outside Colorado: 1-800/446-9488.

ARMY TO ELIMINATE 50 ROTC UNITS, 2 IN COLORADO

The Army will close 50 ROTC units in 27 states, two in Colorado including Mines, as part of a broad plan to reduce the service.

The closings, effective at the end of the 1990-91 academic year, will affect students at colleges and universities mostly in the Northeast and Midwest.

G. Kim Wincup, the assistant Army secretary for manpower and reserve affairs, said closing the Reserve Officers' Training Corps units was deemed necessary in light of the Army's plan to cut its overall active-duty strength by 20 percent over the next five years.

Mines officials expressed keen disappointment that their ROTC program was one of two in Colorado to get the ax. The other was at the University of Southern Colorado in Pueblo.

Spokeswoman Gail Fallen said the School of Mines will ask the Army to review and reverse its decision to discontinue the program there.

She pointed out that the school has had ROTC for 71 years, longer than any other college or university in the state.

"We are extremely disappointed," Fallen said.

"It's clear that the Army based its decision on sheer numbers rather than on the quality of the program. We hope to change their minds."

This fall, there would be 75 students in the school's ROTC program. In 1980, the program had just 15 students.

Wincup said he could not estimate how many cadets would be affected, but he said the Army's aim was to reduce the total number of graduating ROTC cadets to about 6,000 a year from about 7,800.

After the 50 ROTC units are closed, the Army will have 363 units left in 50 states and the District of Columbia, Puerto Rico and Guam.

Eleven units were closed earlier this year.

Wincup said ROTC cadets who are in one of the units to be closed next year but not scheduled to graduate by then will be guaranteed a place in another program only if they are on a scholarship. Non-scholarship cadets wishing to continue in a program will have to arrange their own transfers, he said.

(Reprinted from *The Denver Post*, July 14, 1990.)

The Mines ROTC unit was established in 1919 and has operated without interruption since that time. Mines ROTC has provided approximately 2,100 commissioned officers to the Army Corps of Engineers and other technical branches of the Active Force, Army Reserve and Colorado National Guard during a period including World War II, Korea and Vietnam. Mines ROTC is one of only eight Corps of Engineers affiliated programs in the United States.

Alumni concerned over the scheduled closing of the ROTC program are urged to contact their Congressional delegation.

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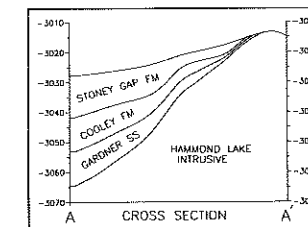
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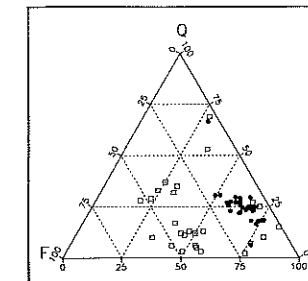
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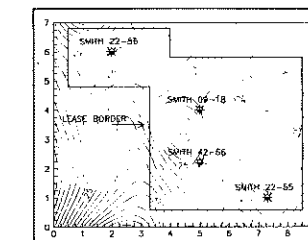
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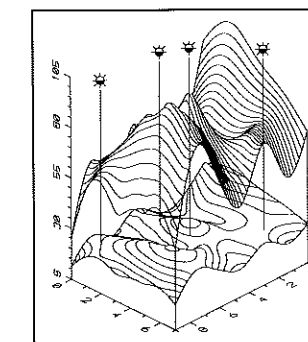
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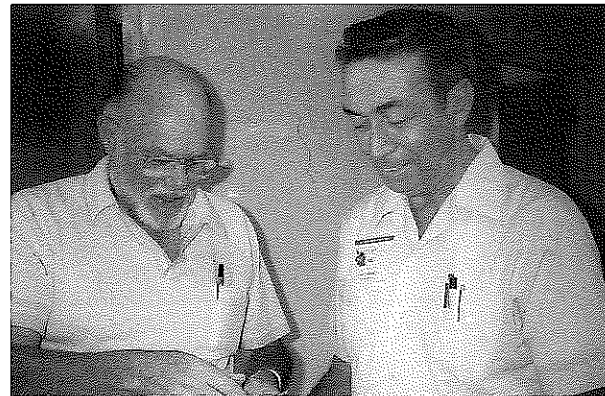
by Ed Warren '50
General Chairman

I would like to personally thank everyone who helped to plan and run the tournament. Without the help and dedication of the golf committee, the CSMAA staff and others, the tournament could not have been the tremendous success that it was.

The golf committee consisted of co-chairman Art Meyer '50 along with Ned Davis '52, Ken Nickerson '48, Paul Owen '71, Jeff Rhodes '82, Steve Sonnenberg '81, Eldon Brickle '66, Tim Hoops '79, Barth Whitham '79, Bob Todd '90 and Mary Jo Giddings. Our photographer was *Mines Magazine* editor Ellen Glover, and CSMAA President Jim Johnstone '48, with Mary Jo Giddings, worked the refreshment cart. All beverages were generously donated by Coors.

Working the par-3 holes were my wife, Pat Warren, CSMAA staff members Judy Arbuckle, Kay Alexander, Betty Myers, Corlee

Art "20 handicap" Meyer made a small wager with Ed Warren that there would be 125 people at the golf luncheon. He later said what he meant to say was that there would be "at least" 125 people. Warren allowed this "slip of the tongue" and agreed to pay off the debt, however, the payoff had to be in front of the Alumni staff so that Meyer could not claim it was never paid. See for yourself! —all in foreign currency.



Rutherford and Deborah Mooney. CSMAA Executive Director Norm Zehr assisted us greatly by extending the full support of the Alumni Association office to the effort.

Patrons, hole sponsors, prize donors and other supporters of the tournament contributed tremendously to the success of the 1990 endeavor. All of these exceptional people and companies deserve our profound thanks and gratitude.

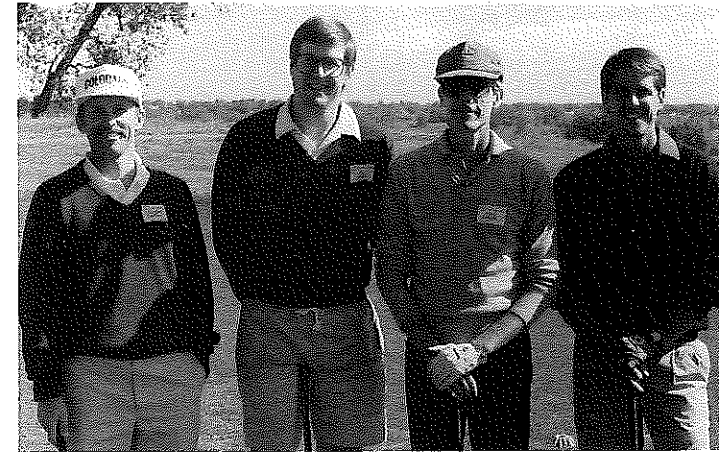
Six years ago at the first annual tournament, 63 golfers participated, and this year 131 golfers signed up which was a 30 percent increase from 1989 so we are experiencing quite a growth in popularity. Three flights of different handicaps were held in order to distribute the awards in a more

equitable manner. Blind drawings of tickets resulted in a number of participants receiving excellent prizes which had been donated by a number of contributors.

On a different note, a few players have complained that certain golfers (and I use that term loosely) should be in a separate "old men's flight" since they seem to be doddering to keep up with all of us young pups. The committee seems to be of the opinion that we could supply canes and wheelchairs or allow free mulligans for these few poor old decrepit golfers! A survey of participants is now underway to address this problem which we hope will be solved by the year 2000.

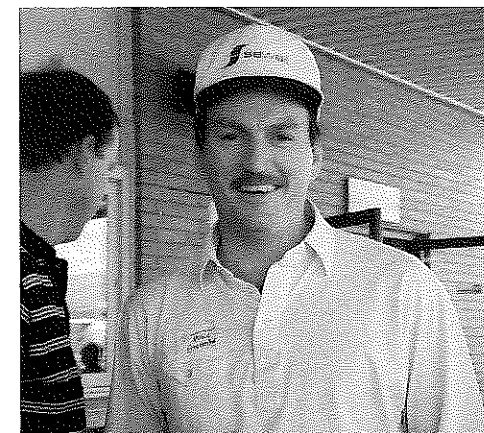
Again, thanks to everyone involved in this tournament which resulted in a record \$6,376 for the CSM Alumni Association Student Financial Aid Program . . . which is the real winner. See you next year.

CSMAA SIXTH ANNUAL GOLF TOURNAMENT Great Success!

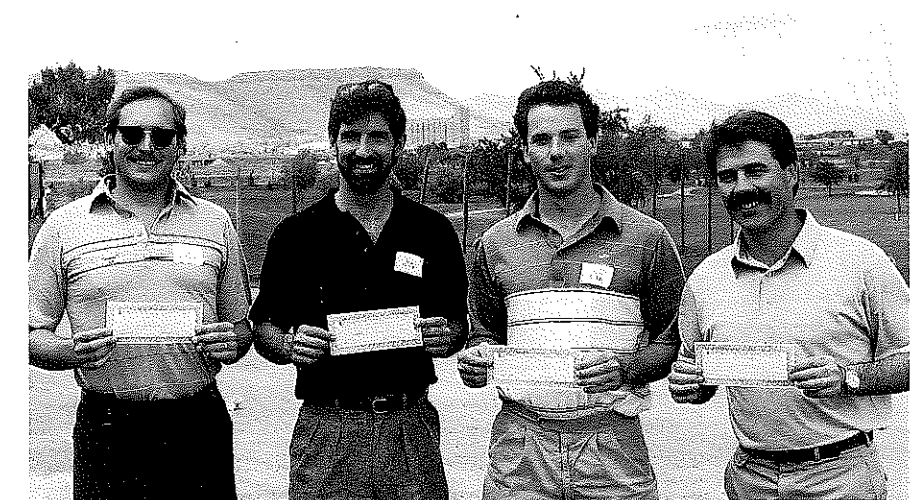


Winners of flight #1 with a score of 56 and 14 under par were (left to right) Doug Carlson '84, Tim Hoops '79, Dave Cowan '71 and Tom Konrad '84. (photo by E. Glover)

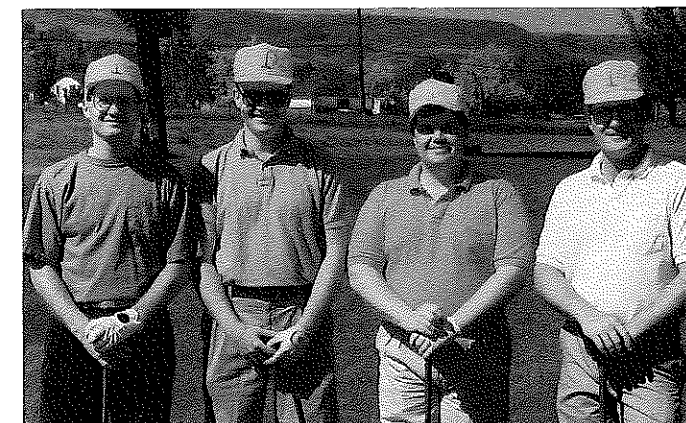
Following two days of rain and hail, beautiful sunny weather greeted the 131 golfers participating in the Sixth Annual CSM Alumni Association golf tournament held May 31 at the Applewood Golf Course in Golden. Tournament Chairman Ed Warren '50, proudly reports that a record high of \$6,376.29 was raised for the CSMAA Student Financial Aid Program—\$2,100 more than last year!



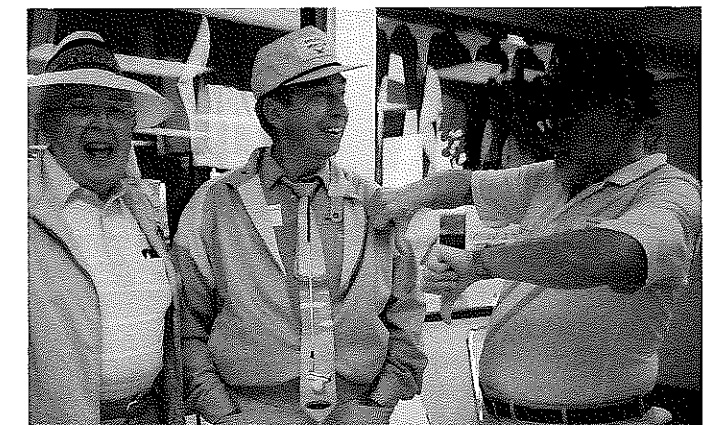
After the tournament was over, a barbecue was served and numerous outstanding door prizes were awarded. Mike Greunke, a golfer and hole sponsor with Colorado National Bank-Golden, was the winner of a season pass to the International at Castle Pines. (photo by M.J. Giddings)



With a score of 63, flight #2 was won by (left to right) Dennis Gibson from SECO, Bob Read '83, Bob Todd '90, and Pete Borer '80. (Photo by E. Glover)



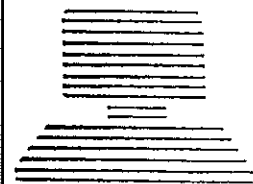
Coming in first in flight #3 and scoring a 62 were (left to right) Ken Tholstrom, Bruce Wright, Don Erickson and Don Valenti—one of the two teams sponsored by Summit Drilling Fluids. (Photo by E. Glover)



Jim Johnstone '48, CSMAA President, and Ed Warren '50, tournament chairman, "admire" the tie of Art Meyer '50, tournament co-chairman. Johnstone had the important responsibility of driving around the golf course delivering liquid refreshments to all the golfers. All beverages were compliments of the Coors Brewing Company. (Photo by M.J. Giddings)

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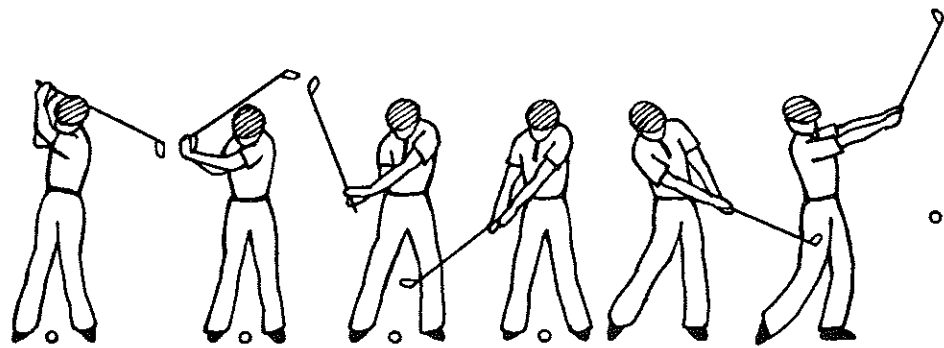
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DICK VAN HORN '47

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CALENDAR

August 9

HOUSTON ALUMNI—SIT DOWN LUNCH, Galleria, W. Loop 11:30-12:30; \$11; no speaker; RSVP 713/726-9477.

August 11

CSMAA BOARD OF DIRECTORS MEETING—Golden. Wiley Room/Ben Parker Student Center; coffee 8:00 a.m.; meeting 8:30 a.m.

August 25

DENVER ALUMNI NIGHT WITH THE DENVER ZEPHYRS VS. IOWA CUBS (Chicago Cubs Farm Team) game time 6:45 p.m.; reserved tickets \$5.00; (\$4.00 if over 60 or under 14 years old); Free CSM pennant to first 20 alumni who make reservations.

September 10

DOWNTOWN DENVER ALUMNI—BREAKFAST MEETING. Details to be announced; call Roger Hutson (BSc. Geol. '82) 303/292-2322 or Claudia Rebne (BSc. Geop. '84; MSc. Geop. '86) 303/298-2720 for information.
Speaker: Governor Roy Romer.
Petroleum Club.

September 13

HOUSTON ALUMNI—BUFFET LUNCH. At Houston Engineering and Scientific Society (HESS); 2615 S. Fannin 11:30-12:30; \$11; no speaker; RSVP 713/726-9477.

September 23-26

SOCIETY OF PETROLEUM ENGINEERS ANNUAL MEETING, New Orleans, Louisiana—Hilton Hotel. CSMAA alumni breakfast; *Tuesday, Sept. 25*, 6:45 a.m.-8:15 a.m.; \$15; Speaker: Dr. Craig Van Kirk, CSM Petroleum Engineering Department Head.

September 23-26

AMC MINING CONVENTION '90, New Orleans, Louisiana—Fairmont Hotel. CSMAA Alumni Breakfast, *Wednesday, Sept. 26*, 7:30 a.m.-9:00 a.m.; \$14; Fairmont Hotel, The Wildcatter Room; RSVP Alumni Office.

September 23-26

SOCIETY OF EXPLORATION GEO-PHYSICISTS ANNUAL EXPOSITION, San Francisco, California. Details of alumni function to be announced. Speaker: Dr. Phil Romig, CSM Geophysics Department Head.

September 23-28

ORE DEPOSITS AND APPLIED VOLCANOLOGY SEMINAR, San Juan Mountains, Colorado. Presented by Cruson and Pansze, Geologists, in conjunction with CSMAA. For additional information call Art Pansze 303/279-0172 (FAX 303/278-3461).

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 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; after game reception.

November

SOUTHEAST DENVER ALUMNI. Speaker: Dr. Frank Schowengerdt, CSM Vice President of Academic Affairs. Details to be confirmed later; Section Coordinator Noelle Sears (BSc. Eng. '86).

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 Dec. 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 25-28

1991 ANNUAL MEETING OF THE SOCIETY FOR MINING, METALLURGY, AND EXPLORATION—Denver, Colorado. For more information call 303/973-9550.

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.

May 1-3

MINE QUEST—DIVERSIFICATION FOR THE 90's, the Pacific Northwest Metals & Minerals Conference, hosted by the Columbia section AIME-SME, Spokane, Washington. For more information contact: Jack J. Satkoski, 509/353-2711.

May 8-11

COMMENCEMENT/SPRING REUNION WEEKEND, Golden. A special invitation to the classes of 1981, 1976, 1971, 1966, 1961, 1956, 1951, 1946, 1941, 1936 and 1931; many events scheduled including Senior Banquet May 9; Commencement and Reunion Class Dinners May 10; All Alumni Banquet May 11.

June 16-18

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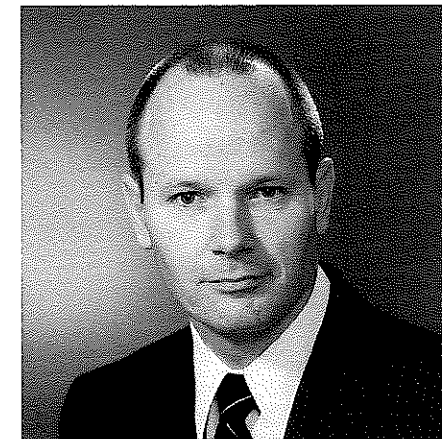
ALUMNI UPDATES

50s

'53 **Paul D. Hinrichs, Geol. E.** is senior geologist for BWAB, Inc. in Denver, Colorado. **G.H. (Jerry) Bryant, E.M.** has been nominated as one of the Mining Men of the Century in Wyoming and will be remembered in the *Wyoming Mineral Magazine*, August, 1990 during Mining Month, as proclaimed by Governor Mike Sullivan. Bryant, with longtime associates from Rampart Ventures, is now exploring through Helena Gold Co. precious metal properties in Montana and over the West, which are suitable for leach-method production.

60s

'64 **Stephen D. Chesebro', P.E.** has been named president and ceo of Tenneco Gas, a subsidiary of Houston-based Tenneco Incorporated.



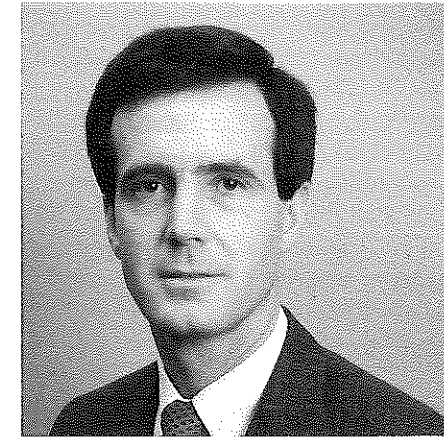
Stephen Chesebro, '64

'65 **John A. Turley, P.E.** is manager/worldwide drilling for Marathon Oil Co. in Houston, Texas.

'67 **Kenneth A. Miller, Geop. E.** is a consulting geophysicist for Amerada Hess in Texas.

'68 **Albert (Ted) Seep, Met. E.** is principal process engineer for M-K Environmental Services in Denver.

'69 **Peter S. Wyckoff, E.M.** is project manager for Pinckneyville Mining Co. in Pinckneyville, Illinois. **Alistair H. Montgomery, MSc. Met.** is project manager for Canonie Environmental in Denver. **Samuel B. Clifford, Geol. E.** is principal engineer for Westinghouse Hanford Co. in Richland, Washington.



Todd Brown, '69

Todd A. Brown, Met. E. is vice president/quality for Metal Container Group in Sunset Hills, Missouri.

70s

'70 **Stephen A. Onorofskic, E.M. and MSc. Min.** '71 is mine manager for Eagle Gypsum Mine in Eagle, Colorado. **Gary D. Miller, Geol. E.** is a joint interest coordinator for Pennzoil in Houston, Texas. **Thomas M. Monchak, Math. E. and MSc. Math.** is project manager for Daniel, Mann, Johnson & Mendenhall in Scottsdale, Arizona. **Craig Horner, BSc. Pet.** is an orthodontist in Littleton, Colorado. Craig and his wife, Marianne, a clinical instructor in the undergraduate School of Nursing, University of Colorado, returned July 1 from attending the US-USSR Emerging Leaders Summit, sponsored by the American Center for International Leadership. The Horners, delegates to the Medicine and Health Care Commission, attended conferences in Minsk, Sochi and Moscow. **Richard J. Kehmeier, BSc. Geol. and MSc. Geol.** '73 is manager of exploration for Atlas Corporation in Denver. **B. William Distel, Geol. E.** is a geotechnician for Woodward-Clyde Consultants in Glenwood Springs, Colorado.

'71 **Robert F. Reiner, BSc. Pet.** is drilling superintendent for Wexpro Co. in Rock Springs, Wyoming.

'72 **Dean Willis, BSc. Math.** is manager/mining systems for Mincom USA, Inc. in Denver.

'74 **Murray M. Aitken, BSc. Min.** is operations coordinator for Roadway

Services, Inc. in Marysville, Washington. **Stanley E. Knaus, BSc. Met. and MSc. Met.** '75 is senior engineer/environmental waste department of Westinghouse in Richland, Washington. **Wayne A. Sadik, BSc. Geol.** is manager/environmental compliance for American Ref-fuel Co. in Texas.

'75 **Keith R. Brownlee, BSc. Geop.** is director of resource planning for the Arco Corporation in Los Angeles, California.

'76 **Jeffery J. Manion, BSc. Met.** is general manager for A-Tek in Brainerd, Minnesota.

'77 **David G. Winslow, BSc. Met.** is engineer/owner of Winslow Resources, Inc. in Golden, Colorado. **Claudio D. Manzollilo, MSc. Geol.** is regional



Claudio D. Manzollilo, '77

geologic manager/ELAFE region for Amoco in Houston, Texas.

'78 **Daniel J. Morehouse, BSc. Min.** is mine production superintendent for IMC Fertilizer, Inc. in Carslbad, New Mexico. **Paul R. Millet, BSc. Met. and MSc. Met.** '81 is senior metallurgical engineer for Waste-Tech Services, Inc. in Golden. **Jeffrey J. Johnson, BSc. CPR and MSc. CPR** '81 is production facilities engineer for South Pacific Chevron Company in Brisbane, Queensland, Australia. **John M. Herr, BSc. Met.** is a consultant with Tennessee Associates in Alcoa, Tennessee.

'79 **Michael A. Smith, BSc. Met.** is a process development engineer for ICI Advanced Materials in Tempe, Arizona. **Susan M. Howarth, BSc. Math., M. Eng. Pet.** '84 and **PhD. Pet.** '87 is a senior member of the technical staff of

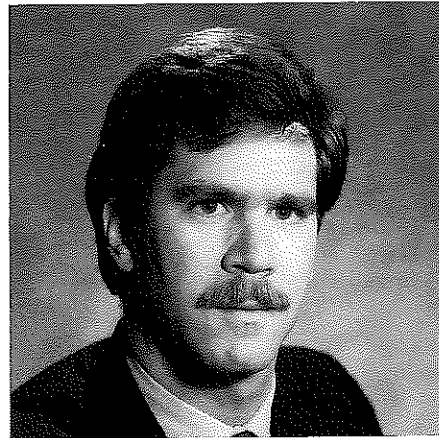
Sandia National Laboratories in Albuquerque, New Mexico. **Glen T. Luther, BSc. Min.** is mine manager/Champagne Mine for Idaho Gold Corporation in Arco, Idaho. **Nathan A. Barton, BSc. B.E.** joined the firm of Kandaras Consulting, Inc., of Rapid City, South Dakota this past July. He completed over eleven years on active duty with the Corps of Engineers, most recently as the executive officer of the Fort Riley Directorate of Engineering and Housing. **Karl A. Hartman, BSc. Min.** is a mine engineer for Tenneco in Rock Springs, Wyoming. **Leslie V. (Puttuck) Pagels, BSc. Min.** is manager/strategic planning for Transco Energy Co. in Houston, Texas. **Bradford J. Bends, BSc. Min.** is senior consultant for KPMG Peat Marwick in Washington, D.C.

80s

'80 **Michael J. Bogenreif, BSc. Min.** is production department manager for Ball Metal Container Division in Williamsburg, Virginia. **Kent Jenkins, BSc. Geol.** is working for Colorado Silica Sand Inc. in Colorado Springs, Colorado as the manager of environmental and technical sales. '81 **Joanna (Sixta) Zernell, BSc. Geop.** is a student at the University of Alaska/Anchorage. **Mercedes A. Murillo, BSc. Geol.** is an environmental scientist for Los Angeles County Sanitation Districts in Whittier, California. **Donald R. Ledbetter, BSc. Min.** has been promoted to detective with the Seattle Police Department/accident investigation squad of the criminal investigation division. He will investigate felony traffic crimes such as vehicular homicide and vehicular assault, as well as investigating/reconstructing serious injury accidents. "Strange but true—I'm doing a lot more math, physics, and drafting in this job than I ever did when I was an 'engineer.' Luckily I kept all my textbooks and notes," reported Ledbetter. **Kenneth A. Giese, Jr., BSc. CPR** is an advanced engineer with Westinghouse Hanford Co. in Richland, Washington. **Dennis N. Genty, BSc. CPR** is assistant vice president/corporate finance for Hanifen Imhoff in Denver. **David O. Freienmuth, BSc. Min.** is an account representative for Teleco Oilfield Services in New Orleans, Louisiana. **Charles J. Vasilius,**

BSc. Met. is an attorney with Baum & Gustafson PC specializing in natural resource law. **Daniel J. Cornette, BSc. Min.** is senior engineer with Cyprus Bagdad Copper Co. in Wickenburg, Arizona. **Christopher M. Nyikos, BSc. Min.** is project engineer for Arco Coal/West Elk in Paonia, Colorado.

'82 **William R. Peters, BSc. Pet.** is an investment stockbroker for Piper Jaffray in Missoula, Montana. **Roger L. Hutson, BSc. Geol.** is exploration manager for Basin Exploration in Denver, Colorado. **Judith L. Bolis, BSc. Min.** is a graduate student/environmental science engineering ecology at Colorado School of Mines. **Lisa Weeks, BSc. Geol.** has accepted a position as the geologist for Baytech Incorporated in Midland, Texas. She would also like to announce the November 17th birth of their daughter, Elisabeth Ann.



Thomas Young, '83

'83 **Thomas P. Young, BSc. Min.** is project engineer for Landmark Reclamation in Denver. **Tom Nickoloff, BSc. Geop.** has been promoted to chief geophysicist of Permian Exploration Corporation in Roswell, New Mexico. **Erick H. Matheson, BSc. Min.** is a mining engineer for Newmont Gold Co. in Carlin, Nevada. **Glenn D. Weller, BSc. CPR** is a mathematical statistician for the U.S. Bureau of the Census in Washington, D.C. '84 **Frank E. Gibbs, BSc. Met.** is manager/physical metallurgy for EG&G, Inc./Rocky Flats in Golden. **Ronald W. Van Zandt, BSc. CPR** is a staff engineer for Conoco in Ponca City, Oklahoma. **Karen G. Ostrander Krug, BSc. Pet.** received her law degree from Lewis & Clark College of Law. She is now working as an attorney/natural resources for Welborn,

Dufford, Brown & Tooley in Denver, Colorado. **Thomas E. Konrad, BSc. Pet.** has been promoted to district engineer/Rocky Mountain region by Conoco and is working in Denver.

'85 **David P. Ballode, BSc. Geop.** is an engineer for Centennial Engineering in Arcata, California. **Craig W. Rautiola, BSc. Min.** is an engineer/Trona Plant operation for FMC in Green River, Wyoming. **Mark A. Odell, BSc. Min.** is a mine engineer for Nevada Goldfields in Austin, Nevada.

'86 **George G. Conger, Jr., BSc. Min.** is senior mine engineer for Newmont Gold Co. in Carlin, Nevada. **Margaret (Peggy) Brannigan, BSc. CPR** was married to Gary Christie May 25, 1990 in Toledo, Ohio. They took a honeymoon cruise to Alaska. **David A. Raich, BSc. Min.** is an estimator for Ohbayashi Corp. in San Francisco, California. **Pasquale Riggi, BSc. Pet.** is reservoir engineer for Shell Oil Co. in Bakersfield, California. **Todd A. Carter, BSc. Math.** is programmer/analyst for BASF/chemical division in Ypsilanti, Michigan. **Adam T. Harvey, BSc. Phy.** is sonar officer in the U.S. Navy aboard the USS Topeka SSN 754. **David M. Wheeler, MSc. Geol.** is a geologist for Ensign Oil & Gas, Inc. in Denver. **Lance O. Hayne, MSc. Min. Econ.** is a processing geophysicist with Western Geophysical in Denver.

'87 **Mary Spaid, BSc. CPR** is a process engineer for Chevron USA in Philadelphia, Pennsylvania. **Mark J. Ollweiler, BSc. Eng.** is product engineer for Denver Equipment Co. in Colorado Springs, Colorado. **Dominic J. Ricotta, BSc. CPR** is an associate attorney for Holme Roberts & Owen in Denver. **Mark J. Vanarelli, Geol. E.** is a hydrogeologist for Clayton Environmental Consultant Corp. in Edison, New Jersey. **Mike C. Wood, BSc. Pet.** is an engineer 2 for Union Pacific Resources/Midcontinent District in Fort Worth, Texas.

'88 **Larry A. Quirk, BSc. Pet.** is a junior engineer with Waste-Tech Services inc. in Golden. Larry and Jo Elizabeth Wisehart are planning a Saturday, August 11, wedding at St. Joseph's Catholic Church in Golden. **Stephanie (Jill) Vincent, BSc. CPR** is a systems engineer for Lummus Crest in Houston, Texas.

'89 **William R. Arnold, BSc. Pet.** is a petroleum engineer with Santos Oil Co. in North Adelaide, South Australia. **Paul M. Veatch, BSc. CPR** is production foreman for Arco Oil & Gas in Texas. **Shun-Ping Chau, BSc. Geol.** is a junior engineer with Estox, Inc. in Lakewood, Colorado. **Joseph B. Hefernan, BSc. Min.** has joined Sir William Halcrow and Partners, Scotland as a geotechnical engineer. **Kathleen M. Kelleher, BSc. Min.** is an assistant section foreman/Powhatan 4 Mine for Consolidation Coal Co. in Clarington, Ohio. **Paul R. Williams, BSc. Pet.** is staff engineer for Giant Exploration & Production Co. in Farmington, New Mexico.

90s

'90 **Jason D. Brockel, BSc. Eng.** is a project engineer for Koch Industries in Billings, Montana.

An open letter to Mines military men and women,

At a recent party in the remote village of Mannweiler-Colln, Federal Republic of Germany, I ran into no less than three other Mines graduates. As the beer flowed (to include Coors if you can believe that), we began to reminisce about the Ace High, Physics 211, E-Days, and the whereabouts of other recent military alumni. The military is a close-knit organization much akin to the Mines experience, and what we found was that we had run into many fellow Miners serving throughout the world. Just to update you on their varied last known locations:

MAJ Jason Hauck, BSc. B.E. 1977, is in Liberia, Africa as a military attaché (what timing with the rebels!?). **CPT Jay Mallery, BSc. Min. 1983, CPT Dave Smisek, BSc. Min. 1983 and LT Todd Wang, BSc. Geol. 1986,** are all in the 43rd Engineer Combat Battalion (Hv) at Fort Benning, Georgia having worked on projects in Costa Rica, Honduras and Bolivia. **MAJ Casey Ross, BSc. Geop. 1977,** was last seen at Fort Belvoir as an instructor. He chose to be the Advanced Course team chief for not only himself, but for **CPT Gary**

Pease, BSc. Geol. 1983, and CPT Dave Goddard, BSc. Min. 1983. At one time the majority of the engineering instructors at Fort Belvoir were from Mines.

CPT Gary Pease is in Karlsruhe, Germany, having last successfully built a large range at Grafenwohr. **CPT Dave Goddard** is at Fort Carson, Colorado, with the 4th Engineer Combat Battalion. **CPT Jerry Olsen, BSc. Geol. 1984,** is also at Fort Carson, Colorado, with the 52nd Engineer Combat Battalion (Hv) and is about to head off to advanced civil schooling. **CPT John and Mrs. Veronica Rovero, BSc. B.E. (respectively),** are in Turkey working for the Corps of Engineers. **CPT Mike Curto, BSc. Met. 1983,** is a commander in Korea with an ordnance company. **LT Orlanda Marquez, BSc. Geop. 1987,** is in Baumholder, Germany. **LT Laura Mandery, BSc. Min. 1987,** is in Karlsruhe, Germany. **LT John Wood, BSc. Eng. 1985,** is in Stuttgart, Germany.

LT Joe Gance, BSc. Math. 1986, is near Mainz, Germany and about ready to head off to flight school. **LT Bernie Jene, BSc. Met. 1987, and LT Karl Gonzalez, BSc. Eng. 1988,** are both near Munchweiler-Colln working toward this summer's removal of chemical weapons in Germany and hosting some great parties I might add. Several former Military Science Department professors are also in Germany although they're about ready to rotate: **MAJ Dave Schnabel (94th Engineers, Darmstadt), MAJ Larry Hartman (Karlsruhe) and MAJ Chuck Foster (Zweibrucken).**

With so many graduates serving in such diverse areas, the Colorado School of Mines is continuing to earn quite a reputation. Should Congress ever consider disbanding the ROTC program at Mines, this effort should be fought vigorously. (See page 29.) Mines past and present produces a unique breed of soldier, sailor, Marine and airman mostly serving in critical engineer related positions.

If you're ever passing through Darmstadt (near Frankfurt), I extend an open invitation to swap a few war stories over some of Germany's best beer (or Coors).

Jeffrey P. Lee, BSc. Geop. 1984
Captain, U.S. Army
HSC 94th Engineer Combat Battalion (Hv)
APO NY 09175

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IN MEMORIAM

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

Charles N. Bellm, E.M. '34, of Morristown, New Jersey, died February 5, 1990.

Charles S. Knox, Associate 1927, of Denver, Colorado, died August 1988.

John Reddin, E.M. '24, of Albuquerque, New Mexico, died October 26, 1989.

Norman Whitmore, E.M. '26, of Los Angeles, California, died March 31, 1990. He is survived by two sisters, two daughters and three grandchildren.

Charles V. Rice, E.M. '28, of Hyde Park, Vermont, died May 11, 1989.

William A. McLaughlin, P.E. '27, of Wheat Ridge, Colorado, died May 6, 1990. He is survived by his wife, Martha; a son, William L. of Wheat Ridge; a daughter, Nancy Brooks of Littleton, Colorado; and three grandchildren.

John R. Wagner, Jr., E.M. '40, of Colorado, died April 10, 1988.

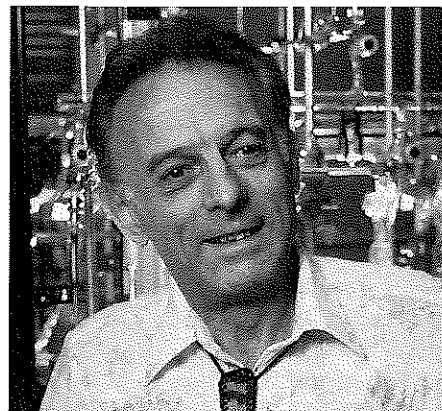
Nicholas N. Kohanowsky, Jr., Geol. E. '32, address unknown, has died.

John E. Bowenkamp, E.M. '32, of Sun City West, Arizona, date of death unknown.

George Pimentel

George Pimentel, professor of chemistry at UC Berkeley and former director of Lawrence Berkeley Laboratory's (LBL) Chemical Biodynamics Division, died in his Kensington, California home June 18, 1989 of cancer. He was 67 years old.

During the 40 years of his illustrious career at Berkeley, Pimentel earned acclaim as one of the world's pre-eminent researchers in chemistry. His titles have included director of UC Berkeley's Laboratory of Chemical Biodynamics and president of the American Chemical Society. He was a member of the National Academy of Sciences and an honorary member of the Royal Institution of Great Britain.



Dr. George Pimentel

He received an honorary degree from CSM in 1987.

Born in Rolinda, California, on May 2, 1922, Pimentel was the son of a building contractor whose schooling ended at the third grade.

"My father was an enormous encouragement," Pimentel once said. "He used to say that if there's anything you should do it's get a good education so you don't have to work with your hands like me."

Pimentel's father also encouraged his sons to tinker with tools, and this willingness to tinker became a hallmark of the chemist's career.

Credited with more than 200 scientific publications and eight scientific books, Pimentel is probably best known by his peers for the discovery and development of chemical lasers to study the dynamics of chemical reactions and for his development of an important technique for infrared spectroscopy called "matrix isolation," which made possible the analysis of short-lived reactive molecules. His pioneering work with infrared spectroscopy led to the instrumentation aboard the Mariner 6 and 7 flights to Mars that revealed the unlikelihood of life on the "red planet."

Among the many honors Pimentel received for his scientific contributions were the National Medal of Science (1983), the nation's highest science award; the Priestley Medal (1989), which is the highest award in chemistry; the Wolf Prize in Chemistry (1983), and the Robert A. Welch Award (1986).

Pimentel was also distinguished for his public service and his contributions to education. He served as director of the National Science Foundation from

1977 to 1980. In 1983, he headed a joint project of the National Academy of Sciences and the National Research Council to produce a comprehensive appraisal of chemistry in the United States. Published in 1985 as *Opportunities in Chemistry*, the book became known as the "Pimentel Report."

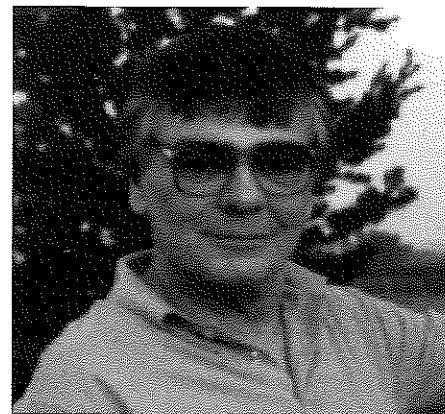
Working with his daughter, Janice Coonrod-Ferguson, a high school chemistry teacher, Pimentel put out a version of this report geared to students, entitled *Opportunities in Chemistry: Today and Tomorrow*. He felt this second version could be even more important than the original if it influenced young people to think about chemistry.

Pimentel won the University of California's Outstanding Teacher Award in 1968 and two national teaching citations in 1970.

Pimentel is survived by his wife, Jeanne; a brother, three daughters, a stepdaughter, a stepson, and five grandchildren.

The family suggests that contributions in his memory be made to the UC Berkeley Foundation. Contributions will be used to help establish a laboratory in his name.

(From *Currents*, June 23, 1989.)



Albert Dugger

Albert L. Dugger

Albert L. Dugger of Grapevine, Texas died May 22, 1990 following a heart attack. He was 57. Dugger was born in Bridgeport, Nebraska May 3, 1933. He received a degree in metallurgical engineering in 1960 from Mines. He served in the Marine Corps and was honorably discharged November 1956.

Dugger spent most of his career in

public works including service as a highway project engineer with the Colorado Highway Department (1965-1970); assistant construction engineer for the city of Fort Worth; city engineer for the cities of Weatherford, Greenville and Azle, Texas; and city administrator and city engineer for Justin, Texas.

He is survived by his mother, Marjorie Dugger of Gering, Nebraska; two brothers, Jerry Dugger of Bluefield, West Virginia, and Robert Dugger (Met. E. '61) of Cambridge, Ohio; four sons, Alan Dugger of Azle, Texas; Mark Dugger, Neil Riva and Paul Riva, all of California; and three grandchildren.

Allan Loleit

Allan Loleit, Geol. E. '50, 66, of Farmington, New Mexico, died Thursday, April 26, 1990. He was born December 6, 1923, at Cleveland, Ohio. Loleit retired from El Paso Natural Gas Co. in 1984. He served with the U.S. Army in World War II in the European campaign, was a prisoner of war in Germany, and was awarded a Purple Heart.

Mr. Loleit graduated from the Colorado School of Mines in 1950, and married Joan Wade in 1952. She preceded him in death in August 1983.

He was an avid stamp collector.

Survivors include three sons, Jerry Loleit and wife Vangie of Tempe, Arizona, John Loleit of Santa Fe, New Mexico and Jim Loleit of Farmington; two daughters, Jeanette Loleit, and Joanne Roberts and husband DeWayne, both of Farmington; and six grandchildren.

Robert W. Patton

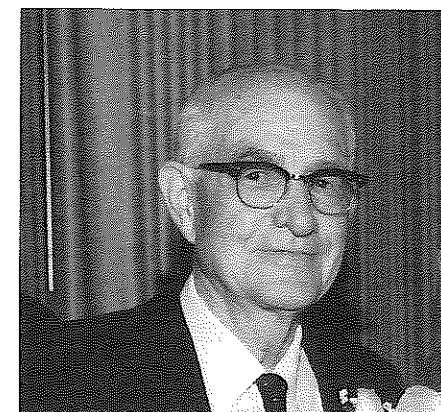
Robert W. Patton, P.E. 1949, died October 20, 1989, near his vacation home on Grand Lake in Oklahoma.

Bob was born in Wichita, Kansas and lived and worked there most of his life. He served as a navigator in the Air Force during World War II. After receiving his degree from Mines, he obtained a graduate degree in geology at Wichita State University. In 1950, he was married to Elinor L. Margrave of Wichita. For many years he was employed by Clinton Oil Company and in 1976 became vice president of Stelbar Oil Corporation in Wichita.

Throughout his career, Bob was dedicated to excellence in his profession

and was greatly admired by his associates. He was a member of the Kansas Independent Oil and Gas Association, The Petroleum Club and the Wichita Country Club. Bob was a serious gardener and fisherman.

He is survived by his wife, Elinor; his mother, Nettie Patton of Newton, Kansas; two daughters, Susan Bonesio of Dallas and Sally Croonenberghs of Golden, Colorado; and a son, Steven Patton, who lives in Wisconsin.



Kennith Schultz

Kennith Schultz

Kennith Schultz, 86, of Amarillo, Texas, died Friday, June 22, 1990.

Schultz, a native of Denver, moved to Amarillo in 1929. He married Ethel Chenot in 1928. She died in 1983.

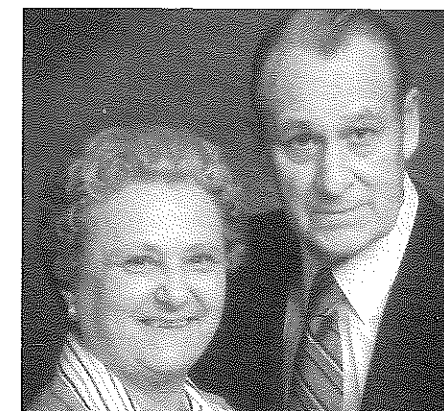
Schultz worked for Asarco following graduation from the Colorado School of Mines in 1929, and all of that time was spent at the Amarillo plant. His first job was as a chemist in the plant laboratory, but a year later he was named assistant superintendent. He held this post until 1954, and for 15 years of that period he was also plant safety director and personnel manager. In 1954 he was made superintendent and became manager of the plant in 1960.

He also has worked in Bisbee and Douglas, Arizona for properties now part of Phelps Dodge Corporation, but this was prior to receiving his mining engineering degree. He also held a Reserve Army commission as Second Lieutenant for five years after graduation.

Schultz was active in civic and church affairs in Amarillo. He was a member of the Texas Panhandle Science Council; the Citizens Budget Committee of the Amarillo United Fund, and the Sal-

vation Army Advisory Board. He served on the Board of Stewards of the San Jacinto Methodist Church for many years. Among his hobbies he listed mineral collecting and horticulture - he had a greenhouse attached to his home and grew plants both summer and winter. The Schultz family also liked to travel. Survivors include two daughters, Martha Webster of Lubbock, Texas and Carol Carthel of Houston, Texas; a sister, Lily Schultz of Denver, Colorado; a brother, Lorenz Schultz of Denver; six grandchildren; a great-grandchild; and several nieces and nephews.

The family request memorials be to San Jacinto United Methodist Church or to The Salvation Army.



Merle & Vivian Gilbreath

Merle L. Gilbreath

Merle Gilbreath died June 23, 1990. He was 78 years old. He graduated from Mines in 1933.

He was a lieutenant colonel in the United States Army, retired. He was a lifetime member of the Colorado School of Mines Alumni Association; a senior member of the American Institute of Mining and Metallurgical Engineers; a professional engineer of Texas, and a member of Crestview United Methodist Church of Austin, Texas.

He began his career in 1933 at a Sinclair refinery in East Chicago, Indiana. After a year he went to Lago Petroleum Corp. in the Lagunillas oil field on Lake Maracaibo, Venezuela, South America where he worked for two years. Returning to the States in 1936, he worked for Stanlin Oil and Gas with T.H. Andrews, a Mines graduate for whom he worked in midwestern Wyoming between semesters while attending Mines. While in

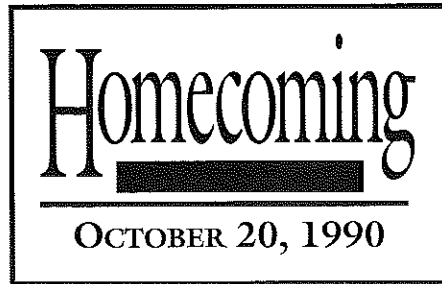
Hastings Field in Texas he met and married his wife, Vivian, at the United Methodist Church of Alvin.

He was field engineer at Greta Field, Texas, then transferred to the Houston office. He worked for the McCarthy Drilling Co. at Angleton, Texas. During World War II, he reported for active duty as an officer in the first instructors course at Fort Belvoir, Virginia, a year before the bombing of Pearl Harbor. At the replacement training center he was an assistant under Col. Louis Prentiss '21, another Mines graduate. He was battalion commander at the replacement training center at Camp Abbott, Oregon and at Fort Lewis, Washington. He was commandant of the Engineer Fire Fighting School of Fort Lewis.

After World War II, he returned to McCarthy Oil and Gas Corp. as superintendent in the Angleton field and later transferred to the Houston office as a petroleum production engineer. When the company was sold in 1956 he went to Pure Oil Co. as a petroleum engineer. In 1965 he joined the General Land Office for the state of Texas in the exploration and development department, under Jerry Sadler, Commissioner of the General Land Office. Here he was able to use all facets of his 32 years of work in the oil industry.

He retired January, 1980 at the age of 69.

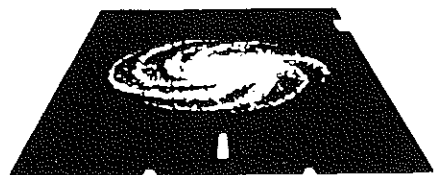
"Bebe Beck," as Merle affectionately referred to his wife of 53 years, and Merle celebrated their golden wedding anniversary in June, 1987 with many friends and family attending. He is survived by his wife, Vivian L. (Beck) Gilbreath. They have four children: Alice Avery, Roy Gilbreath, and Jerry Gilbreath of Houston, Texas and Merlene Inabnett of Shreveport, Louisiana, and nine grandchildren.



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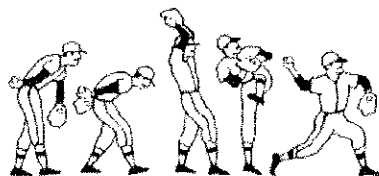
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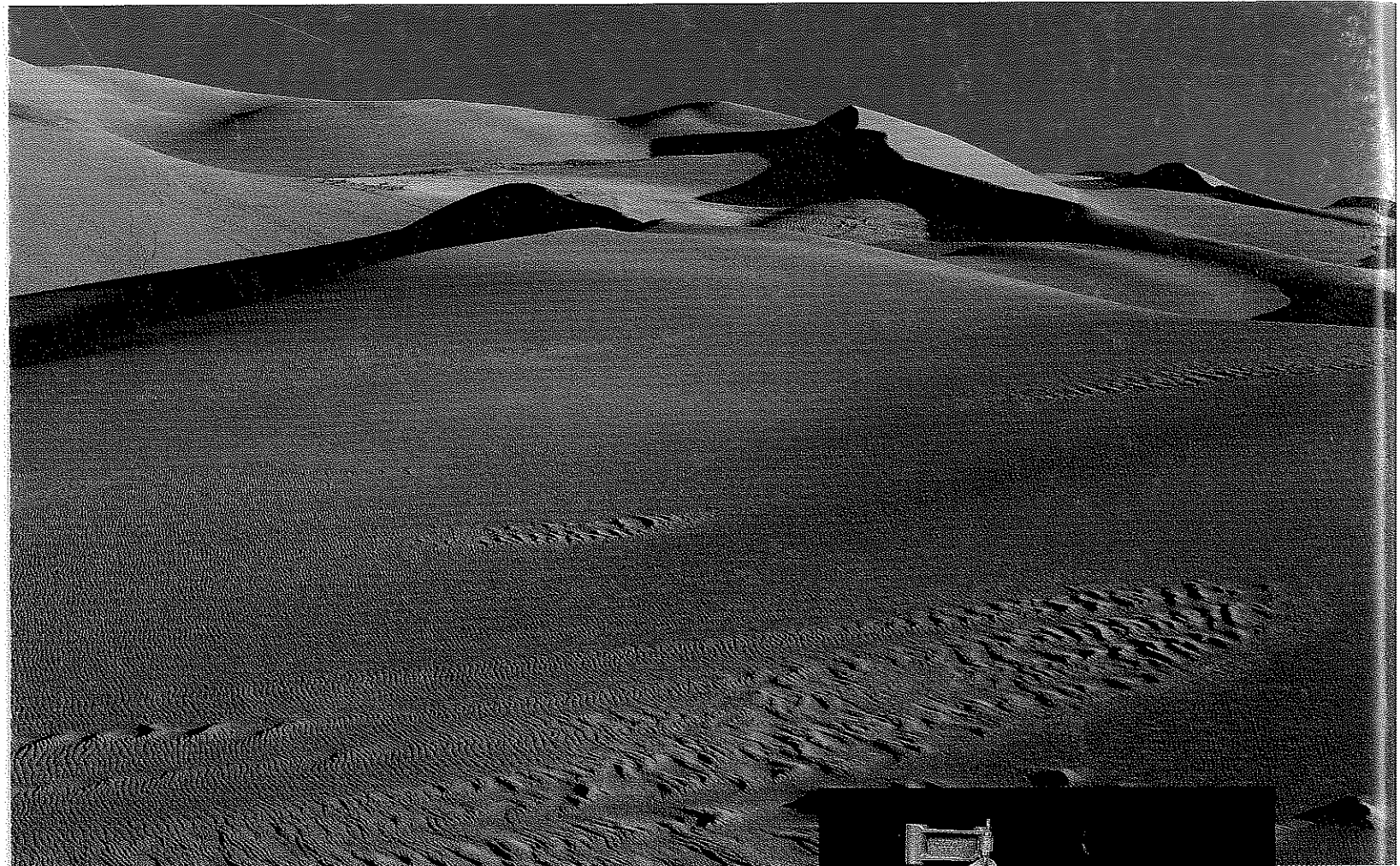
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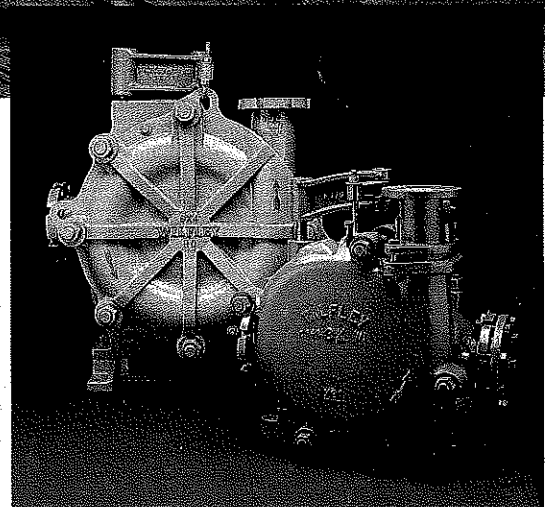


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