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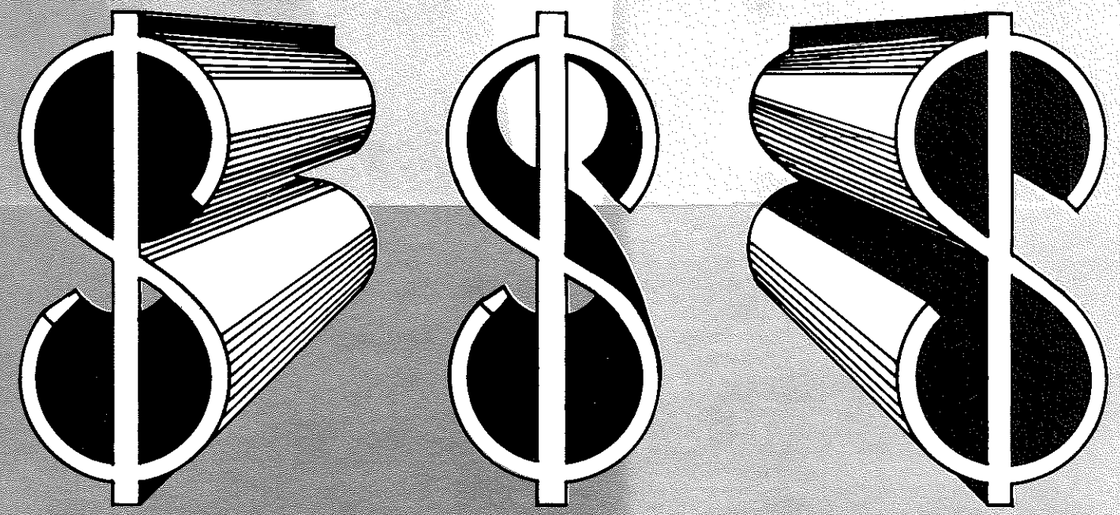

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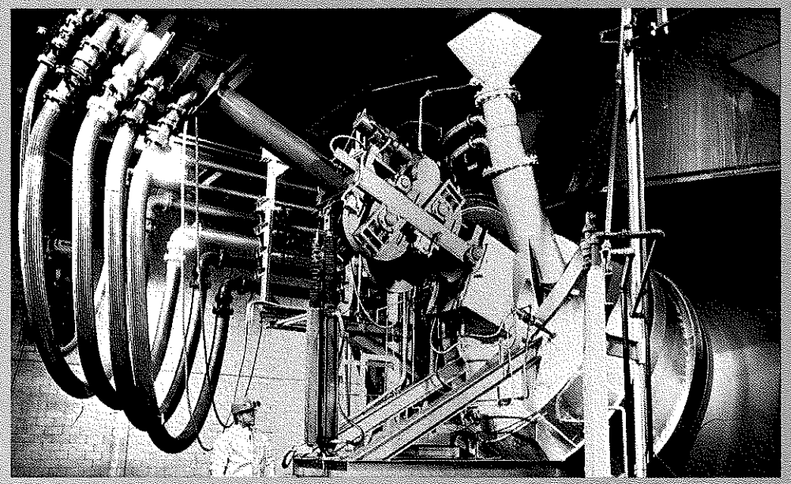

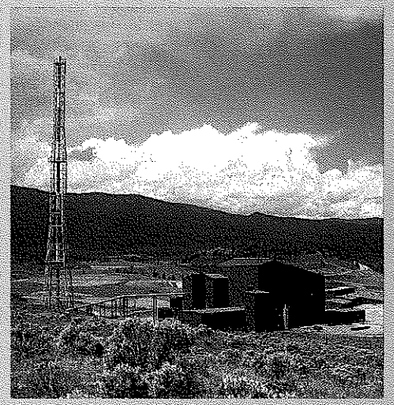

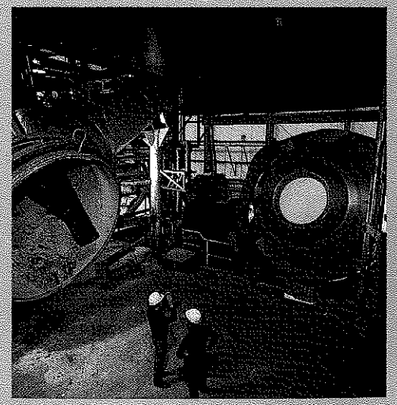

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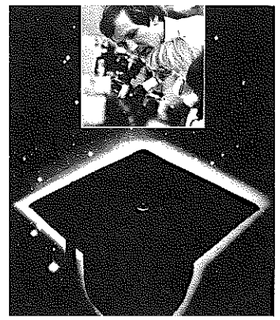

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Campus Interviews

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alumni events calendar

Nov. 4-6—Cont. Ed. "Maintenance Management for the Mining Industry," Denver, CO. For further information contact K.M. Barbour, CSMAA.
Nov. 12-14—Cont. Ed. "Sixth Institute on Mine Health & Safety," Golden, CO. For further information contact H.W. Emrick, CSM (303) 279-0300, ext. 2321.
Nov. 18—SExG Convention, Houston, TX. Luncheon, Sheraton-Houston, 11:30 a.m.
Nov. 19—GSA Convention, Atlanta, GA. Luncheon, Marriott, 11:30 a.m.
Dec. 5—NWMA Meeting, Spokane, WA. Breakfast, Davenport, 7:30 a.m.
Dec. 8-9—AIME-Arizona Meeting, Tucson, AZ. Luncheon to be announced.
Dec. 9-11—Cont. Ed. "Maintenance Management for the Mining Industry," Denver, CO. For further information contact K.M. Barbour, CSMAA.
Dec. 18-19—DECEMBER CONVOCATION; Banquet, Dec. 18, Green Center, 6 p.m.; Commencement Exercises Dec. 19.
Feb. 11-13, 1981—84th National Western Mining Conference & Exhibition, Denver Fairmnt Hotel, Denver, CO, sponsored by The Colorado Mining Assn., 1515 Cleveland Pl., #330, Denver, CO 80202, (303) 534-1181.
Feb. 13—CMA Convention, Denver, CO. Luncheon, Denver Athletic Club, 11:30 a.m.
Feb. 14—FOUNDER'S DAY BANQUET. Dinner to be announced.
Feb. 22-26—AIME National, Chicago, IL. Breakfast to be announced.
May 7-9—1981 COMMENCEMENT, Reunion classes are 1926, 1931, 1936, 1941, 1946, 1951 & 1956. Banquet— May 8, Green Center, 6:00 p.m.; Commencement Exercises —May 9.

mines magazine

volume 70 **november, 1980** **number 9**

features

Cover design depicting mineral economics by Barbara J. Noffsinger.

We Owe an Apology to:

Our readers, for the late arrival of the September and October MINES Magazine. Various typesetting and mechanical problems have now been solved, and we hope that we'll be back on schedule.

Leanne Gibson, who wrote the Energy Institute '80 article on pp. 25 and 26 of the October issue, and did not receive a credit line. Gibson also took the accompanying photographs for this article.

Barbara Noffsinger, design artist, whose graphic skill executed the cover for the October issue. Mrs. Noffsinger is a draftsman and artist who has numerous projects to her credit, including the recent "METALS" publication of the Colorado AIPG. She now adds this cover of MINES Magazine to her laurels.

departments

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Publication #ISSN 0096-4859

Annual Membership Drive

William E. Leckie

With the November issue of the Mines Magazine, your Alumni Association begins the annual membership drive for the 1981 fiscal year. Also with this issue I introduce myself, William E. (Bill) Leckie, as your new Executive Director, CSM Alumni Association. George Mitchell resigned in August to accept a position with Fugro-Rocky Mountain in the Denver area. I have several charges from the Association Board of Directors, and expect to receive additional charges from my new Board to be elected later this year.

Currently I have three primary areas to cover:

1. Visit all local sections; determine their needs and assistance that the Association can provide; then provide what they want.
2. Student needs:
   a. Explain the current, and continuing, student financial assistance needs.
   b. Seek local alumni section aid in providing one-on-one contact with all alumni in the solution of this problem.
3. While not busy with 1 & 2 above, run the Alumni Association in an exceptional manner.

Your Association is composed of five divisions as follows:

1. **Alumni Affairs**—Simply stated, this office carries out the wishes of your Board of Directors on such matters as Homecomings, Mid-year and Spring Commencements, and luncheon-banquet functions for all alumni meetings in Golden or national settings for our school or mineral industry. All administrative functions, student loans, planning, etc., for the Association are handled in the Alumni office.

2. **MINES Magazine**—The Alumni voice of the Colorado School of Mines—This publication, 10 issues a year, furnishes news for the School, the Alumni, and the minerals industry which I hope is interesting and informative to you all.

3. **Continuing Education**—Off-campus courses offered to the minerals industry to increase understanding of and productivity within any subject area that is desired—but the industry must inform us of the area and level of courses desired.

4. **Placement Service**—Your Alumni Association is more informed and aware of the needs of the minerals industry than any routine job placement agency; we are also aware of the expertise of the CSM graduate. In turn, the minerals industry is aware of our service and of our interest in filling their need with a competent CSM graduate. Our policy is not to "head-hunt" for anyone, but to serve as a source of expertise for industry with those CSM graduates who have filed written (confidential) resumes with our service.

5. **Records**—With over 9,000 living graduates, and 7,000 known addresses of those graduates, we have an Association of over 4,000 active members. Each member receives our monthly MINES Magazine and a copy of our yearly Mines Directory, listing name, address and affiliation of all know graduates. In addition, the graduates are further subdivided by graduating class, alphabetically, and geographically.

If your address is wrong or unlisted in this directory it is probably your fault; you either:

1. Didn't advise us of a change.
2. Never joined the Alumni Association, and possibly are one of the 2,000 lost, or
3. We goofed.

So far, the probability is with number 1 or 2 above.

In September I had the privilege of attending the annual meeting of the American Mining Congress in San Francisco. Many excellent papers within your area of interest were presented—and 97 Mines Alumni attended our luncheon on Tuesday, September 23. Mines Student Member of the Board of Trustees, Miss June Leaver, spoke to the group on student life, briefly reviewed the student-faculty-administration discussion of the Keystone Conference reported to you in our September issue of the magazine, and told of the student concern and needs resulting from increased costs of partaking in an excellent mineral engineering education.

Prof. Robert T. Reeder of the Mining Department, Secretary and Director of the Alumni Association Board of Directors, and Director of the Mining Health, Safety and Research Institute followed with a summary of current school events. He covered the current school enrollment of 2,900 students, the Mining Department enrollment of 330, the imminent move of both the Mining and Basic Engineering Departments into the new George R. Brown Hall, and an appeal for industrial-alumni input and expertise into the proposed curricular changes of the Mining Department published as an addendum to this issue of the MINES Magazine. Please give the mining department this help!

The Opening Session of the 1980 AMC Mining Congress in San Francisco was without doubt the most outstanding such event that I have ever attended. Three outstanding speakers; two from government and one from industry presented the existing condition of an over-regulated minerals industry and directly connected the consequences to the economy and defense posture of our country!

I have copies of these presentations and intend to reproduce, or at least summarize them, in this and later issues of the MINES Magazine. These presentations are:

The Adverse Effects of Federal

Regulations by Senator James A. McClure (R-Idaho), **Minerals and National Security** by General Alton D. Slay, Commander, Air Force System Command and **Economic Outlook of Minerals** by Caspar W. Weinberger, Vice President and General Counsel, Bechtel Power Corporation. [Ed. Note. See page 11]

Until I can publish I urge you to seek and read and discuss these important presentations with the general public. To the best of my knowledge, not one word of these important public pronouncements appeared in a single San Francisco paper—or any other national publication—so far as I can determine.

Later that day Senator Dennis DeConcini (D-Arizona) spoke to the welcoming luncheon. His message paralleled that conveyed in the opening session with a much more restrained political viewpoint. This message dealt with government's role in the complex problems of the mining and energy industries, and was reported in the local and national press and is also worthy of your close attention.

I look forward to working with the Alumni Association, hope to visit with you at your local meetings, and most of all, to provide your sections with any desired support from the School.

William E. Leckie

—mm—

Ten Years of Mineral Economics at Mines

In the fall of 1969, the Board of Trustees of the Colorado School of Mines established a separate degree-granting Department of Mineral Economics. In ten short years the Department has grown to be the largest such graduate program in the world with over one hundred and fourteen students pursuing masters and doctoral programs. During the history of the Colorado School of Mines it has become common-place to expect CSM graduates to be the best mineral engineers in the world. Why then did the Board of Trustees see fit to add this, a special program in Mineral Economics? There is little question that the program was established to meet a perceived industrial need. The typical Mines graduate usually rose rapidly to the top engineering position in his or her chosen company. There was, however, a need for additional education for the typical Mines graduate in the specific areas of management and evaluation of economic alternatives. Acting on this need, the Board of Trustees of CSM established the Department with two major objectives for its activities:

(1) the academic training of mineral engineers in economics analysis and management skills which would enable them to rapidly assume increasing responsibilities in corporate management; and

(2) the education of mineral engineers to do feasibility studies for mineral and energy development and utilization projects, both in the public and private sectors.

Undergraduate Responsibilities

The Mineral Economics Department at Mines is generally viewed as a graduate department. Since its inception, however, the Department has also had a considerable responsibility in undergraduate education. Every undergraduate Mines student is rquired to take two courses through the Department; micro and macro economics. The purpose of this requirement is to provide every Mines student with a thorough grounding in the fundamental tenets of free-market economic systems on both national and international levels. Students may complete a minor program in Mineral Economics by taking such additional courses through the Department as *Resource Economics, Industrial Organization, Business Law, Labor Relations, Economic Evaluation, or Applications of Management Science.* The purpose of these courses is to broaden the base of the student for managerial and economic evaluation responsibilities.

Program

The Mineral Economics Department was initially set up to grant only the Master's degree. In response to industrial demand for greater depth of education in the mineral economics field, the Department was authorized to grant the Doctor of Philosophy degree in 1974. As of June, 1980, one hundred and ten Master's degrees and thirty-three Ph.D. degrees have been granted. There has always been a uniform requirement that the degree be relevant to real mineral and energy problems in the private and public sectors. Due to this requirement, many theses and dissertations are based on work done for, and supported by, a private company.

In the early years of the Department, there was considerably more emphasis on the second objective defined by the Board, that of feasibility studies for mineral and energy project development. This emphasis was exemplified by the establishment of the Coulter Foundation Professorship in Mineral Economics in 1968. This chair is still occupied by the original recipient, Dr. Alfred Petrick.

As time progressed, there was a considerable increase in industrial demand for mineral engineers who had acquired the skills to move rapidly onto the fast track of corporate operations and production management. Anticipating these needs, the Department acquired faculty qualified to offer the desired emphasis on the first objective of the Board, the education of mineral engineers in economic analysis and management skills.

The managerial training within the Department is run on the "guild" system; students share office space with the professor and are expected to work on real mineral and energy-related projects for national and international companies. The students, rather than the professor, are responsible and thus paid for the consulting work done. It is the duty of the professor to seek such projects for the students and certify and guarantee the quality control of the results. All theses and dissertations completed by the students in this program *must* meet the following standards:

(1) work must involve a *real* problem proposed by a participating company;

(2) results of the work *must be implemented* by the company; and

(3) the student must prove that *the work has resulted in a verifiable cost reduction or profit increase to the company according to generally accepted accounting and/or auditing principles.*

The Department faculty contends that these simple requirements have a proven positive effect on the student's understanding of business and corporate reality.

There are basically two types of projects in this program, those done by a single student and those done by a group of students. Typical of a single student project would be the management audit of the U.S. Steel plant at Oil City, Pennsylvania by Dr. Patrick Allen (now a First Lieutenant in the U.S. Army Corps of Engineers) in his first semester in the program. As a result of his brief study, the Department received a letter of commendation from the vice president of manufacturing, Mr. John P. Higley. Typical of the projects done by groups of students is a study for a mineral subsidiary of a multinational company concerning whether a $200,000,000 investment in a pipeline should be made. This study was requested by the company last April and was completed by six students and the supervising professor in time for delivery to corporate headquarters *in ten days*, as was required. The most recent group project involved a study, again to be delivered in ten days, for a multinational corporation and concerned the feasibility of acquiring a mineral subsidiary with assets exceeding 1.6 billion dollars. The study was completed and delivered ahead of schedule by three students and the supervising professor.

The real benefit of projects such as these is the fact that the students have access to actual industry problems and solutions *while they are still in school,* an obvious plus on their resumes.

As a final note, the Department Head has initiated a special incentive plan for his students. Any student who can save $1 million for his employer in one year on one project by either reducing costs or increasing profit (according to gener-

ally accepted accounting and/or auditing principles) receives a diamond stickpin. It is worth mentioning that the last student to receive his stickpin did so *during the first three weeks on the job.* Letters of verification are available to interested readers by writing the Department Head.

What Kind of Students Do We Have?

It should be immediately clear that projects such as those mentioned above cannot be done by any "ordinary" graduate students. In the few years' existence of the Mineral Economics Department there has been a startling rise in the quality and age of the applicants for the program. As an example, last years' departmental admissions committee reviewed applicants with scores of 99th percentile on the verbal section of the Graduate Record Examination. Quantitative scores on the same exam were usually above the *90th* percentile for *all* applicants.

As an example of the interest in the Mineral Economics program on an international level, we now have in the Master's program the former Director of the Bureau of Mines of Costa Rica. Sharing an office with one professor we find a petroleum engineer with five years' field experience with Texaco, a Juris Doctor from the University of Indiana, and an economist with a Master's degree who was a registered lobbyist for the American Iron and Steel Institute in Washington. There is little question that we are dealing with a more mature, earnest graduate student than we have ever seen before. What may be even more impressive is the fact that, for the past few years, the Department has had, on the average, at least five applicants for every opening in the program. What is it that these students are being *taught*?

What Are the Students Getting?

Programs in an academic institution usually start with very loosely defined requirements and slowly evolve in response to changes in demand. The emphasis of the Mineral Economics program is on performance and practicality. Students are expected to be result-oriented but cognizant of the diverse economic and non-economic elements under study. To better define the direction and thrust of the Mineral Economics Department, a departmental retreat was held with representatives from mineral and energy companies which have hired our product in the past *and* student representation. The result of this retreat was a complete reorganization of the graduate program. There is now a common core required of all students in the program. This core of eighteen hours includes the following topics:

Fall Semester:	**ME 511**	**Intermediate Economic Theory (Microeconomics)**
	ME 512	**Applied Macroeconomics**
	ME 555	**Linear Programming and Network Flows**
Spring Semester:	**ME 510**	**Natural Resource Economics**
	ME 504	**Engineering Economics**
	ME 590	**Economic Forecasting**

After completion of the common core, students select course work according to their interest, in consultation with the advisor, committee members, and the Graduate School to complete the appropriate degree. Familiarity with technical aspects of the mineral and energy industry is assumed in all course work. The students are expected to focus their attention on a specific area of mineral and/or energy engineering for their thesis research.

Academic Goals

The goal of the degree program in the Department of Mineral Economics is to graduate students qualified in each of the five major areas:

(1) Economic analysis and policy effects,

(2) Feasibility studies and financial assessments,

(3) Operations and quantitative management methods,

(4) Data collection, verification and manipulation, and

(5) Communication.

The fifth requirement is present because the student must realize that all of the knowledge of the first four areas is useless unless it is communicated in an understandable and convincing format. On the wall in the Department Head's office there is a large sign which says:

> "A manager would rather live with a problem he cannot solve than accept a solution he cannot understand."

To drive this point firmly home, an interesting policy has been adopted by some members of the Department. On all written work submitted for a grade, *each spelling error, grammatical error or punctuation error drops the grade one letter.* Mineral Economics faculty members who practice this policy have noted a most gratifying rise in ability of written communication among the students. Students are observed to be purchasing dictionaries and copies of Strunk and White's *Elements of Style.* This is a procedure which we believe can only benefit the students, the Colorado School of Mines, and the companies which hire our graduates.

Where Do the Mineral Economics Students Go?

The great majority of graduates of Mineral Economics go directly into the mineral and energy industries and, with rare exceptions, choose the private sector. In the early days of the program, students usually entered some phase of corporate planning or economic evaluation. Now, with an increasing demand for mineral engineers with managerial skills, more and more of the graduates are moving up through the ranks of operations and production management. We have been frankly told by recruiters that the managerial side of our program is viewed as producing a minerals-oriented MBA. The rapidity with which our recent graduates have achieved managerial status lends credence to this assertion. The feasibility studies and economic evaluation side of our program continues to grow as financial institutions realize the need for mineral economists to evaluate loans to the mineral and energy industries. The companies desiring those loans are naturally most interested in hiring mineral economists to package loan requirements so as to maximize acceptance by lending authorities. We have already had, in a number of cases worldwide, the situation where the mineral economists on each side of the loan were graduates of this department.

Salaries offered to graduates of the Department, as of June 1980, averaged roughly $5,000 over the student's age. As believers in free market economics, we feel that we have some indication that we are doing something right.

Energy Field Institute

The Energy Field Institute is an educational activity serving Colorado School of Mines students and external audiences. The goal of the Institute is to provide better understanding of complex regional issues surrounding development of Western energy resources, by providing firsthand experience and observation opportunities which cannot be duplicated in the classroom setting. The program was designed originally as an annual Western energy update for Washington Congressional and executive aides. Now in its fourth year, the Institute has attracted a following among Washington aides and national environmental and energy journalists. In addition, several other groups and organizations have asked the Institute to plan programs in 1981.

The Institute offers opportunities for the articulation of multiple perspectives on issues surrounding energy development in a target area. Answers are not provided nor is it even expected that solutions will emerge. An open atmosphere for information exchange encourages dialogue among affected parties and participants. Positions on issues are thus in process rather than firmly entrenched or polarized too soon. The Institute field method is proving its worth in saving time, effort and considerable dollars for affected parties in problem solving. These qualities of the Institute method will become more critical as energy development becomes ever more technically, politically, internationally economically and socially complex.

Providing a forum for the discussion of the many aspects of energy development is best accomplished by an objective organization. CSM lends its academic expertise and resources to the analysis of the complexities of Western energy development. The Institute has established the value of its method, but has barely tapped the audiences which will eventually benefit from participation in its programs. The Institute and CSM plan to expand the Energy Field Institute in partial fulfillment of the academic community's responsibility to society.

CSM-DU Joint Degree Program

In response to the growing interconnection of economic and legal issues confronting the minerals industry, the Colorado School of Mines and the University of Denver established a joint-degree program in mineral economics and natural resources law. Under this cooperative program, selected students simultaneously pursue a Juris Doctor in law and either a MSc. or Ph.D. degree in mineral economics. The express intent of this program is to educate a group of highly trained lawyers and minerals industry managers who will approach their careers with a greater appreciation of multidisciplinary issues, methods, and perceptions.

Sponsored Programs and Research Programs

Sponsored programs and research in the Department of Mineral Economics are currently focused on three major areas. These areas are the macroeconomics of regional resource development, public policy and natural resources, and market development for appropriate technology. The departmental sponsored programs and research provide financial support for nine graduate students, three research faculty, one secretary, and summer funding for several of the academic faculty. During this past year, the research program provided most of the funds used for capital improvements and equipment in the Department. The value of sponsored programs and research projects in progress is in excess of $250,000.

In the area of appropriate technology,

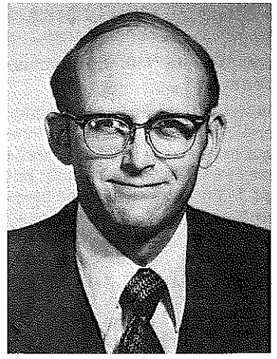
the Department of Mineral Economics has taken a leading role in researching market development for alcohol fuels and solar industrial process heat. During the past two years, this part of the Department's sponsored research program has provided thesis topics for three graduate students. Funding for the various projects in this area has been provided by the Colorado Department of Agriculture and the Solar Energy Research Institute.

A most active program in the area of public policy and natural resources is the Energy Field Institute. The Institute is cultivating a unique and distinct focus, more completely described elsewhere in this article. The Energy Field Institute serves to more adequately inform public policy makers about the unique issues that surround energy resource development. The Institute is in its fourth year and is typically funded by agencies such as the Department of Energy, Bureau of Mines, Office of Surface Mining, United States Geological Survey and the Colorado Energy Research Institute. Additionally, private funds have been provided by ARCO Coal Company, the Public Service Company of Colorado, the Hewlett Foundation, Rocky Mountain Energy Company, W. R. Grace and Company, and The Philipp Foundation. One graduate student intern per year is sponsored by the Energy Field Institute and several other students are employed on an as needed basis.

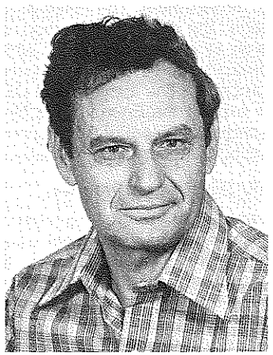
The Department of Mineral Econmics provides the leadership for the Policy and Research Program of the Mining and Minerals Resources Research Institute (MMRRI-P.L. 95-87) at the Colorado School of Mines. During the past two years, this program has sponsored five fellows, two of whom have finished their degress. The MMRRI Policy Program and Resources has also served in an interdisciplinary mode to provide expertise for other research programs at the Colorado School of Mines, Colorado State University, and the University of Colorado. Specific work for the Colorado General Assembly has also been undertaken by this program.

The major driving force behind research in regional resource development has been the need for interindustry (input-output on I-O) models for firm, agency, and public purposes. The development of these models is basically a cooperative effort between the Colorado School of Mines and Colorado State University. For the last four years the joint CSM-CSU team has produced an average of five primary data based models per year. The focus subject material of these models has ranged from coal to labor to natural gas to water. The subject study regions have ranged from northwest Colorado to the

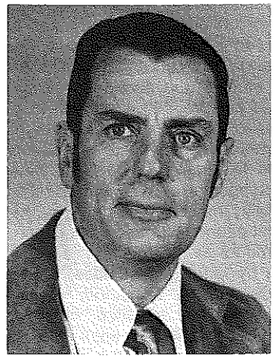
Dr. R.E.D. Woolsey



Dr. Joseph Weber



Dr. Oded Rudawsky



Dr. Alfred Petrick

Dr. Ruth Maurer

Powder River Basin, Wyoming; to the City of Greeley, Colorado; to the Ogallalla High Plains of Colorado. Depending on the projects, as many as five graduate students may be employed by these activities at any given point in time. The typical funding agencies for this portion of the Department of Mineral Economics research program are the Bureau of Land Management; the Department of Energy; the Forest Service; and the Colorado State Department of Agriculture.

The members of the Department of Minerals Economics academic faculty who have been involved in contract research this past year include Drs. Ruth Maurer, Oded Rudawsky, and Joseph C. Weber. The research faculty members are Drs. Ray C. Ericson and Janice C. Hepworth, and Mr. James Kennedy.

Where Are We Going and How Will We Get There?

It has been the primary goal of the Department to assemble the finest mineral and energy economics and management faculty it is possible to obtain. Our next goal is to challenge this faculty by attracting the most intelligent, probing, potential entrepreneurs we can find. We would then hope that the graduates of the program would rapidly become the cadre from which our country's next group of mineral and energy managers are selected. Contrary to a trend observed in many large public universities, we are more concerned with turning out leaders for the private, rather than public, sector. Our logic for this approach is simple: by educating primarily for the private sector, we maximize the chances that our graduates will do well enough to be able, and willing, to return and support the school which produced them.

We believe that the above goals, a faculty and student body second to none, can be accomplished in the following manner:

Every professorship and fellowship in the Department should be named for and funded by a private corporation. We feel that this should be done to emphasize to faculty and students the true economic base of their support, that government may spend but does not produce.

In the pursuit of this goal, and through the good offices of the Colorado School of Mines Foundation, Inc., *three privately funded professorships have been established for the Department within the last nine months.*

The funded professorships established are:

(1) The **MAPCO** Foundation Professorship,

(2) The **Phillip Brothers** Professorship (sponsored by Engelhard Minerals and Chemical Corporation), and

(3) The **John M. Olin** Foundation Visiting Professorship.

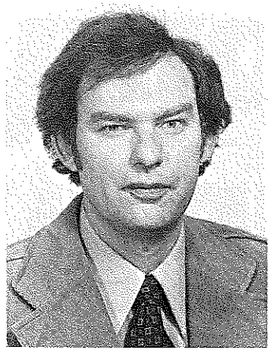
Each of the above professorships was established to meet a very different need in the Department. The MAPCO professorship was established to attract a world-class operations and production management professor to work in the areas of quantitative methods for the minerals industry. The Phillip Brothers professorship was established to attract a professor of international stature in the macro aspects of mineral and energy economics. The John M. Olin Visiting professorship was established to attract to the campus one of the leading free-market economists to insure that our graduates are exposed to a top-level presentation of capitalistic economics.

We feel that the above privately-funded professorships show that the private sector is willing to meet the challenge of assisting the Colorado School of Mines in becoming increasingly allied with the private sector. The economic philosophy of the Department could be summed up in the following statement:

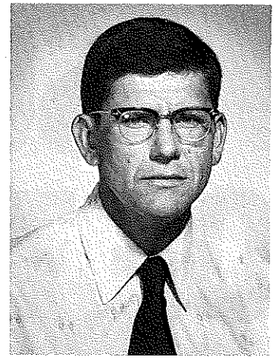
"Free enterprise and competition are not philosophies to be defended, but gospel to be spread."

—mm—

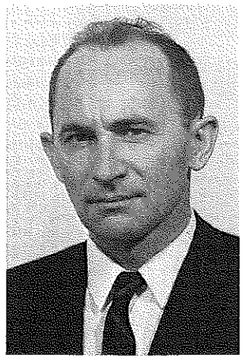
Dr. Frank Stermole



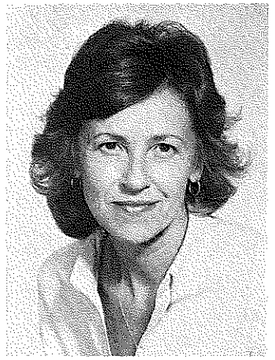
Dr. John Cordes



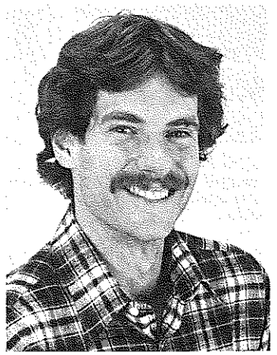
Visiting Professor Charles Lienert



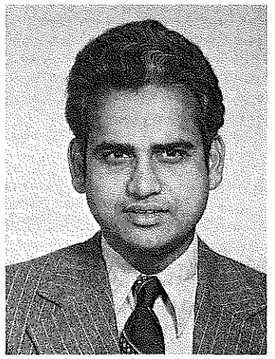
Dr. W. John Cieslewicz



Dr. Janice Hepworth



Dr. Lynd Gilliam



Dr. Anshumall Gangwar

The Adverse Effects of Federal Regulations

by Senator James A. McClure, (R) Idaho

In the 1960's we saw a country growing economically, growing industrially, and concerned about environmental quality. As I moved from the Idaho Legislature to the United States House of Representatives, in 1967, my vision of these growths changed. In the late 1960's Congress passed major environmental legislation—*the Wild and Scenic Rivers Act, the Endangered Species Act, the National Environmental Policy Act and the Clean Air Act.*

In the 1970's, the growth in environmentalism dominated public policy—with little regard to economic and industrial losses.

Somewhere during the '70's we lost the vision of a protected environment. We confused it with an attitude called "no growth." Now, I fear, no growth has crippled economic and industrial development. These adverse effects are evident in the restrictive legislation continually being passed, in the regulations, and in the adversary relationships which exist among our administrative agencies and industries.

Development of legislation is an attempt to reach a goal. While there may be a difference of opinion in the need to attain certain goals, there are few who would not support protection of the environment.

The government feels that its responsibility is to protect the environment by preventing development. So, it expands laws and regulations. To mention a few: National Environmental Policy Act, Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, Occupational Safety and Health Act, Mine Safety and Health Act, Wilderness Act, Fish and Wildlife Act, National Pollutant Discharge Elimination System, Federal Land Policy and Management Act, and Mine Reclamation Act. This is the domino theory in action. The legislation seems simple at first, then after a year, more or less, we see the impact.

Consider this: the preamble to the Constitution of the United States contains 52 words. It explains the purpose and functions of the United States government. Those 52 words say it all. Last year it took a government agency 11,400 words to explain one regulation on growing olives in California. James Madison wouldn't have understood. Neither would Alexander Hamilton.

Nor do the olive growers.

In contradiction to President Carter's campaign promises to cut back on regulation, the *Code of Federal Regulations* that governs almost every phase of our lives now takes a shelf 15 feet long. We've grown two feet of shelf in the last three years. At this rate, the shelf will soon be out in the parking lot.

Laws, regulations, the adversary position between government and industry. What else? Agencies. Back in 1954, before the environmental movement and the no growth philosophy, we had four major areas of regulatory responsibility in the government: antitrust, SEC, transportation, and communications.

Now, how many?

The General Accounting Office cites 116 agencies, the Carter Administration, 90 agencies, the Center for Study of American Business, 55 agencies, and the Senate Joint Committee Report, 41 agencies. No matter what the number, it is too much.

The Constitution protects us from a dictatorship by the President or the military, but even the genius of our forefathers didn't foresee dictatorship by limitless and faceless regulations. We can't say impeach "him," because there is no "him" to impeach. The regulations, the demands, the orders govern us all, with extreme penalties for those who don't obey.

These regulations cost our country 103 billion dollars a year—$2,000 for each household. The American family can't affort $2,000 pilfered from the cookie jar. Nor do they need or want $2,000 worth of additional regulation but that's an issue which hasn't received much public attention, not even in industry publications.

Laws, regulations, adversary positions, cost and policy conflict. To comply with the regulations of one agency, you often violate the regulations of another. If the back up warning horn on your truck is loud enough to satisfy one agency, it's so loud it violates the regulations of another. On a broader scale, it reminds me of a letter I got from one crusty old prospector in Idaho who summed it up best. "The government is so big it's falling all over itself."

1970 Policy Act

There is no doubt that an effective, coordinated policy, intended to encourage mining and mineral development, must be implemented. **Implemented,** not **developed,** because this brings to light the Mining and Minerals Policy Act of 1970.

In less than a page, the 91st Congress declared that it was the continuing policy of the Federal Government, in the national interest, to foster and encourage private enterprise. Had this intent been implemented, we might have seen some coordination between agencies and policies.

Ten years later, Congress is making another attempt at setting priorities. The National Materials and Minerals Policy Act of 1980 passed the House and was favorably reported by the Senate Energy Committee. Should it pass into law with the changes made by the Energy Committee, it will provide a strong stepping stone for mineral development. This bill makes the President responsible for identifying, and making recommendations for appropriate policies and programs to ensure adequate, stable and economical materials supplies essential to national security, economic well being and industrial production. But more important, it requires the President to recommend to Congress specific legislative and administrative initiatives necessary to reconcile policy conflicts This includes an assessment of Federal policies which affect every stage of the materials cycle, from exploration to final use. This is a beginning, a first step earmarking

legal responsibilities to the President.

We are in the beginning of a new decade, the 1980's. Laws, regulations, adversary positions, agencies and policy conflicts are taking their toll. Laws that seemed straightforward are found complex. Laws and regulations have increased our costs and delayed our development. Uncertainty about future laws are discouraging new projects. Last, and most criminal, innovation is squelched.

It's hard to develop new mining projects and maintain current production with all these disincentives. Consider the adversary relationship between the Mine Safety, and Health Administration, Coal Division, and a coal mine in Colorado. The mine was closed because of what MSHA cited as an imminent danger in the roof. The mine owners hired a consultant and the State of Colorado was called in. But no imminent danger was found. MSHA persisted in closing the mine. Twenty-five days later, MSHA allowed the mine to reopen provided that the mine develop a new roof control plan. Six months later the courts agreed with the mine that no imminent danger was present. In a letter to me, the company stated, "It is always nice to be the winner, but that does not take away the problems caused by the closure, nor does it pay for the thousands of dollars in legal fees and expert inspection." Mandatory citations and penalties are working against its own objectives.

I find this representative case alarming. I am afraid the current administration and a majority of the Congress do not understand that these regulations slash our mineral development. Without mineral development and domestic production, this country faces a bleak future—an unstable economy, and an unsure national security. Our performance and production is being prohibited. I am distressed by the inability to strike a balance. Valuable resources have been locked up, development has been restricted, and costs of current development have been significantly increased.

Right now we do not have the votes in Congress to make needed changes. We do not have a coalition strong enough to counteract the environmentalists and no growth advocates. Most important, we do not have an Administration which will emphasize programs to improve and secure economic stability and national security.

Congress and the Administration have cooperated in locking up valuable resource lands. They have imposed the Central Idaho Wilderness Act. I adamantly opposed wilderness designation for the Idaho area rich in cobalt. Not enough Senators supported me. Among those that fought against a balanced bill were some from mining and public land states. Although this area is designated as a Special Mining Management Area, the compromise was too great. This only illuminates Congress' waffling between wilderness and resource development. While President Carter was signing the Central Idaho Wilderness lockup, he turned to supporters and quipped, "I'd like to ask you all to move to the Hill now and help us with Alaska." *They all laughed.*

The fate of Alaska lands was already bleak. On that same day, consideration of the Bill moved from open debate on the Senate floor to a closed door meeting in the Capitol. The votes to prevent a lockup of Alaska were not there. The President, Cecil Andrus and the flower sniffers had won again.

Do not be mislead. Our problems do not originate solely from four years of Carter Administration. Congress has been doing its share for a whole lot longer. Economic stability and national security have been weakened by more than just land withdrawals. The government has made it easier to rely on foreign sources than to develop our own. The strategic and critical materials stockpile has not been sufficiently funded, and target objectivs are not met. Of 93 commodities listed, 50 are short. It would have taken us, in March of last year, 410 million dollars to buy the necessary materials.

In 1977 I introduced a bill to base the quantity of stockpiled material on the country's needs and dependency. Materials that the United States does not produce in significant quantities would have a reserve equal to 3 years worth of net imports. Materials which the United States produced in insufficient quantities would have a reserve of 2 years, materials which are produced here in substantial quantities, but still with some import dependence would have a reserve of one year.

The bill never passed,and two years later, the Stockpile Act was amended with an overall 3 year supply, which the President deemed sufficient for a war or other emergency.

I recall speaking to oil company executives back in early 1973—before anybody was really thinking about energy. I tried to make two points: First, that the price of oil was going to jump to five, even ten dollars a barrel, and second, that the United States would begin paying a political price for oil. Those oil executives were amused and disbelieving.

The price of oil jumped way above five and ten dollars a barrel, and the gas lines appeared. Americans are being held prisoners because of the power oil has over the world. The Ayatolla Khomeni would have no power at all, except that he has oil, and the world needs it.

I cautioned of an an energy crisis because of all the facts were there. It took no genius on my part. And nearly the same facts are present today in relation to minerals. We are heading into a minerals crisis in this country. Government policy is driving us into a minerals dependency just as we have become dependent on foreign sources of energy.

I know you're not amused by these statements. I feel like I'm preaching to the choir, because most of my audience would agree that our dependence on foreign minerals is reaching the crisis stage. As in energy, however, it may take a real crisis before the public pays attention.

Industry and some Congressmen know what needs to be changed, and we know where we will go with the current Congress and Administration. We are responsible for seizing the opportunities of 1980. It is right to change, and it is *imperative* to change. Our countries' foundation, and its continuing success, are based on change and advancement. It may seem forgotten now, but it has always been so. We need to remember the words of Thomas Jefferson:

"Laws and institutions must go hand in hand with the progress of the human mind. As that becomes more developed and more enlightened, as new discoveries are made, new truths discovered and manners and opinions change, with the change of circumstances, institutions must advance also to keep pace with the times."

Change takes time and courage. The time is now, and our courage will be reflected on November fourth.

The foregoing speech was given by Senator McClure at the opening session of the American Mining Congress' fall meeting in San Francisco, CA, September, 1980.

—mm—

Assault on Economic Incentive

by J. Peter Grace

The deteriorating environment for business in the United States could fairly be termed, "The Assault on Economic Incentive."

Congressman Jack Kemp of New York describes the initial part of the adverse environment thus;

At the May 15th meeting of the Investment Company Institute, Robert J. Boyd of London-based investment advisors, GT Management Ltd., was negative on investments in the U.S. stating, according to the Washington Post:

"The principal reason boils down to this equation: Investment results are high where government consumption is low; they are low where government consumption is high."

The Deteriorating U.S. Economy

	(1)	(2)	(3)	(4)
		6 Years Ending		% (Deterioration)
	1968	1973	1979	1968-1979
(1) Federal Spending as % of GNP (Average %)	19.4%	20.6%	22.1%	(13.9%)
(2) Real GNP (Avg. Ann. % Change)	4.7%	3.4%	2.5%	(46.8%)
(3) Unemployment Rate (Average %)	4.4%	4.7%	6.8%	(54.5%)
(4) Real Business Investment (Avg. Ann. % Change)	7.3%	4.0%	2.1%	(71.2%)
(5) Productivity (Avg. Ann. % Change)	3.4%	2.1%	0.6%	(82.4%)
(6) Inflation (Avg. Ann. % Change)	2.4%	4.9%	8.5%	(254.2%)
(7) Federal Deficit (Average, $ Billions)	$(3.9)	$(9.2)	$(36.6)	(838.5%)

"If you tax something, you get less of it. If you subsidize something, you get more of it. The problem with the United States today is that we tax work, savings, thrift, production, capital, and we subsidize non-work, welfare and consumption."

With the Windfall Profits Tax we are going to have a lot less domestically produced oil and a lot more Chryslers than natural forces would produce.

Economic growth in the United States has slowed from 4.7% per annum for the six years ending 1968 to a 3.4% rate for the six years ending 1973, and, now, to only 2.5% for the six years ending 1979, a deterioration of (46.8)% from the first six-year period to the latest six-year period.

Because the climate for private investment has been so poor in recent years, the amount of capital per worker has been declining since 1975.

American labor has been deprived of the tools to do the job, and productivity has been in an almost catastrophic downtrend.

This has meant higher prices, more inflation and erosion of America's competitive position.

	Present Real Value Of $1 Invested In 1960	Government Spending As % Of GNP
Japan	$2.69	8.8%
Germany	.97	16.9%
U.S.	.58	21.4%

In net, international investment advisors at the meeting "warned against putting money into American capital markets during the next decade unless the U.S. government effects radical changes in the economy such as increasing savings rates and decreasing government spending."

Japan and Germany know how to handle foreign trade activities in a much more efficient manner than the U.S.

While the value of oil imports for the U.S. is only 21% of total energy consumption versus 74% and 53%, respectively, for Japan and Germany and while imports represent the same percent of exports as for Japan—32%-33% and 3 times the 11% rate for Germany.

With 5.3% of the world's population the U.S. consumes in gasoline—I have to say shamefully—9.3 times its percent share of world population or 49.3% of the world's total.

The price of gasoline at the pump in the U.S. is only $1.29 per gallon versus:

$2.00 in Latin America
$2.10 in Africa
$2.45 in Japan
$2.75 in the EEC.

Energy is the area that best illustrates poor management and the failure of Administration policy in the U.S. Through administered price controls on U.S. domestic production, we have subsidized the consumption of energy—particularly we have subsidized the consumption of our scarcest forms of energy—oil and gas—in lieu of increased use of coal of which we have almost unlimited supplies.

During the years 1960-71, the price of low sulfur coat was $.55 MMBTU. Low sulfur coal was only 12.2% higher in cost than low sulfur residual oil.

All this changed in the early 1970s when, with the imposition of price controls, the price of oil and gas became cheaper than the price of coal. The price of coal in 1972 was 30.8% and 6.3%, respectively, higher than the prices of oil and natural gas. On this basis, and thanks to prodding by the government, many utilities switched from coal to oil and gas.

It is almost incomprehensible that anyone in a responsible position would have taken action that insured (a) the under-utilization of our most abundant energy source and (b) the exhaustion of our oil and gas resources, resulting in the present situation of dependence on imports.

Once in place, it is a formidable task to break the grip of government bureaucracy. Despite recognition of the problem of under-utilization of our coal resources, particularly with the formation of OPEC in 1973, we still have encouraged the use of oil and gas and placed obstacles in the path of increased use of coal.

There is no situation that should command greater attention than the coal vs. oil and gas use in the U.S. To meet the need we have to unshackle these industries and let the market forces take command.

There is an almost continuous bar-

rage of broadcast propaganda against the price of oil in the United States. It is of interest from this chart to compare the increase in the cost of a barrel of oil in the United States with the increases that have been instituted over the same period of time by the TV networks for commercial broadcasts.

Ordinarily, we see government measured in relation to the overall economy in tems of total GNP and in the latest two years Government-Controlled Expenditures as a Percent of GNP were at 32%.

From 5% of total credit market borrowings in the early 1950's, the Federal Government's appetite has grown to 23% in the latest 5-year period.

Federal Government Crowding-Out Private Investment (Billions of Current $)

Years	(1) Total Credit Market Borrowing	(2) Federal Borrowing	(3) Federal As % of Total
(1) 1950-54	$ 24.8	$ 1.2	5%
(2) 1955-59	35.8	2.4	7%
(3) 1960-64	49.3	3.0	6%
(4) 1965-69	76.2	4.8	6%
(5) 1970-74	156.5	22.8	14%
(6) 1975-79	336.5	77.3	23%

Federal Government preempting 4½ times the 1950/54 position in credit markets.

This not only means there is less money for productive investment—it also means the cost of money is higher.

As projected in 1977, the Administration under-estimated expenditures by $10.8 billion in 1978, $27.7 billion in 1979, $72.3 billion this year, $84.5 billion for the fiscal year beginning October 1, and **$124.6 billion** for fiscal 1982.

What if American businesses were run this way?

Comparison of TV Commercials and Domestic Oil Prices (Current $)

		(1) 1975	(2) 1979	(3) 1979 Increase Over 1975 Percent	(4) % Increase of Each as % Increase of Upper Tier Oil
		Cost of 30-Second Commercials			
(1)	World Series	$ 52,200	$100,000	91.6%	944.3%
(2)	Super Bowl	110,000	200,000	81.8%	843.3%
(3)	Academy Awards	80,000	145,000	81.3%	838.1%
(4)	Wide World of Sports	15,200	26,000	71.1%	733.0%
(5)	Average Prime Time	30,700	51,000	66.1%	681.4%
(6)	Summer Olympics (a)	42,000	65,100	55.0%	567.0%
(7)	Winter Olympics (a)	34,500	44,800	29.9%	308.2%
		Cost of a Barrel of Oil			
(8)	Lower Tier Oil	$ 5.03	$ 6.00	19.3%	199.0%
(9)	Upper Tier Oil	12.03	13.20	9.7%	100.0%

(a) 1976-1980

Food Stamp Program

From a modest beginning of $900,000 in 1961, the Federal Food Stamp Program has ballooned to an estimated cost of $9.2 billion in 1980 per the latest Congressional estimate. In other words, the Food Stamp Program has grown to **10,000 times** its original size.

Now no one will deny the rights of the needy and the disadvantaged to food and other necessities. The point here is that this is a program which has expanded far beyond its original concept— at great cost to the taxpayer— and it is symptomatic of what happens to Federal programs once they are established and perpetuated.

Food Stamp Program Costs

	Fiscal Year	Millions of Current Dollars
(1)	1961	$ 0.9
(2)	1965	35.1
(3)	1970	578.0
(4)	1975	4,619.4
(5)	1976	5,625.7
(6)	1977	5,425.9
(7)	1978	5,543.5
(8)	1979	6,868.9
(9)	1980 Budget	8,744.8

Latest Congressional Estimate is that the Food Stamp Program will cost $9.2 Billion in 1980—Equal to the entire Federal Budget in 1939.

The Congressional Budget Office has estimated that if we limit Social Security indexing to 85% of the Government's reported increase in the cost of living, $40 billion could be saved in the next five years. Since people receiving Social Security benefits are in the main not subject to some of the major increases in the cost of living, such as the increasing cost of purchasing a new home, the Congressional Budget Office has not hesitated to identify this as a potential source of savings.

The Congressional Budget Office also calculated that even if Social Security payments continued to be indexed at 100% but with a correct measurement of increases on the cost of living for retired individuals, $30 billion could be saved by 1985.

The Congressional Budget Office has identified duplications in the Food Stamp and School Lunch programs which, if eliminated, could save $1.5 billion per year by 1985.

These two items are simply examples of possibilities for savings on transfer payments; savings that would, in no way, defeat the intent of the programs.

By comparison, individuals dependent on private employment have fallen from 71.5% of all income earners in 1950 to only 50.3% in 1978. This is another measure of the problem of the ever expanding scale of government that will have to be dealt with effectively if we are to reverse the decline in the U.S. economy.

Income Taxes

Prime consideration should be given to reducing the tax burden of individuals.

If the maximum tax rate on incremental income were reduced to 36% from the present 70%, this would still cost only 4.9% of the total revenue and the income base would have to increase by only 3.1% to make up for this loss.

This is based on tax returns for 1976— the latest available figures.

Think of the stimulus of cutting the maximum tax in half.

High tax rates have extremely negative effects on savings, the lifeblood of investment and economic growth. When the tax rate fell on average from 26.6% during the years 1960-1963 to 24.8% in the years 1964-1975, the average savings rate in the U.S. economy increased from 5.1% to 6.9%.

Taking a middle level income of $25,000 per annum, in constant 1979 dollars, due purely to inflation over the years 1972-1979, taxes on this income increased by $926 as inflation pushed this income into higher levels of illusory nominal income. The tax reductions enacted from 1972 to 1979 reduced the tax on this $25,000 of income by $483.

In net, there was an increase in the tax on the $25,000 income of $443 from 1972 to 1979. The politicians don't tell us this. They don't tell us that their tax reductions offset only 52.2% of the automatic tax increase on a $25,000 income that was due to inflation alone.

Our friends in Washington are trying to look like heroes by giving us income tax decreases. They hope that most people are thinking that they are real tax decreases and for a while some people did.

The point is that the government is preempting more and more of the total economy and squeezing out the private sector.

Personal Taxes on a percent of personal income, have increased from 9.5% in 1976, the year just preceding Mr. Carter's Administration, to 11.3% in 1979. Per the 1981 Carter budget, this percentage is scheduled to move up progressively to 14.9% in 1985 which is unbelievable in the context of the World War II high of 12.3%.

Thus, of the $2,600 increase that the $25,000 income person would get if his income kept pace with inflation in 1980, the Federal Government proposes to take 19.2% or $499. This is the kind of flim-flam that has caused so many people to lose confidence in our government and to employ every means of avoiding and evading income taxes.

It also means that individuals are losing control of an increasingly larger portion of their income, since it is being preempted by government. In effect, the government is telling us where our money should go and how we should spend it, and this represents a very serious threat to our personal and economic freedom.

We move now to the key issue of the proposed reduction in the capital gains tax to 20%. If inflation got down to a sustained 9% annual rate, with the proposed 20% capital gains tax a 100% nominal pretax profit would still be turned into a (0.5)% average annual rate after tax loss.

Conceptually, there is no basis for any capital gains tax whatsoever on long-term investments. By definition, such taxes reduce the capital formation process which is so essential to attaining adequate productivity and economic growth. Thus, on grounds of inflationary conditions that exist and persist, as well as the dictates of conceptually sound economic policy, the capital gains tax should be eliminated completely.

At an inflation rate as low as 8% and a nominal tax pretax profit as high as 150%— over the average 7.2% year holding period—the investor must have the benefit of a tax *subsidy* to match the 5.7% rate of return of the 1960's.

This shows the severe disincentive effect of capital gains taxes coupled with high inflation. The solution? Eliminate this tax altogether.

Pretax Income Required For A Family of Four To Maintain 1972 Real Purchasing Power

Assuming Future Tax Cuts Porportional to 1972-1979 Experience and 10% Per Year Inflation

		(1)	(2)	(3)	(4)	(5)	(6)
(1)	1972	$ 10,000	$ 20,000	$ 30,000	$ 40,000	$ 50,000	$ 100,000
(2)	1979	17,681	35,888	55,558	75,784	95,206	182,860
(3)	1986	35,585	76,320	119,962	160,876	198,929	369,948
(4)	1993	77,160	166,337	253,182	332,931	406,889	739,953
(5)	2000	167,670	345,971	513,359	668,061	812,119	1,460,973
		Percent Increase From 1972					
(6)	1979	76.8%	79.4%	85.2%	89.5%	90.4%	82.9%
(7)	1986	255.9%	281.6%	299.9%	302.2%	297.9%	269.9%
(8)	1993	671.6%	731.7%	743.9%	732.3%	713.8%	640.0%
(9)	2000	1,576.7%	1,629.9%	1,611.2%	1,570.2%	1,524.2%	1,361.0%

INFLATION

The problem of high tax rates is, as we have seen, compounded by inflation.

As inflation goes up, so do tax revenues—only at a much faster rate.

The impact is particularly severe on

middle-income workers earning between $20,000 and $40,000 a year. These are the people who make the economy go—the young professionals, the factory and mine workers, sales people working on commission. They are being penalized for their hard work. On average, each 1% increase in taxable income raises Federal revenues by 1.6%.

If you retire at age 65 with a $10,000 pension and have the average life expectancy of 14 years, and if inflation is at 20% per annum, then in the 14th year of retirement your purchasing power is only $779 or less than 8% of the original pension.

It is among the aged and other disadvantaged that inflation inflicts its greatest harm.

Comparison of U.S. and Soviet Defense Outlays
Calendar Years, 1970-1979
(Billions of Constant 1979 U.S. $)

	(1)	(2)	(3)	(4)
			U.S. Above/ (Below) U.S.S.R.	
	U.S.S.R.	U.S.	Amount	Percent
(1) 1970	$ 126.5	$ 140.0	$ 13.5	10.7 %
(2) 1971	129.7	126.0	(3.7)	(2.9)%
(3) 1972	132.5	116.0	(16.5)	(12.5)%
(4) 1973	138.0	112.0	(26.0)	(18.8)%
(5) 1974	145.3	108.5	(36.8)	(25.3)%
(6) 1975	149.5	105.5	(44.0)	(29.4)%
(7) 1976	156.5	105.0	(51.5)	(32.9)%
(8) 1977	155.5	107.0	(48.5)	(31.2)%
(9) 1978	161.5	107.0	(54.5)	(33.7)%
(10) 1979	165.0	108.0	(57.0)	(34.5)%
TOTALS				
(11) 1970-79	1,460.0	1,135.0	(325.0)	(22.3)%
(12) 1971-79	1,333.5	995.0	(338.5)	(25.4)%

Reserves

Throughout history, the one dependable store of value during inflationary periods has been gold. What has our government been doing with the U.S. gold stock?

Instead of holding on to our declining share of world gold reserves, the U.S. has been busy selling off our gold and silver reserves over the past 30 years.

Between January 1st, 1950 and April, 1980, the U.S. Government sold 433.3 million troy ounces of our gold reserves. These were sold at an average price of $44.56 which compares with the current price of about $500. Because of the sale of these reserves at the lower price, the U. S. Government realized $(197.3) billion less than would have been the case if the reserves had been kept and sold at $500 an ounce.

Similarly, with regard to silver, the loss is $(20.0) billion.

The total of these two losses, amounting to $(217.3) billion over a 30 year period, could have financed 73% of all the Federal deficits or paid for 88% of all our oil imports in that period.

International

We still have the outstanding position in the production of food but, thanks to a lack of policy, we are not making effective use of this capability.

CROPEC

Three people, Malcolm Fraser of Australia, Pierre Trudeau of Canada and General Videla of Argentina are the only ones we would have to reach agreement with to control wheat, corn and soybean export prices to the same extent as 11 to 24 nations control oil prices.

We should be making fast and warm friendships with these three people and move towards an idea which I call CROPEC, an Organization of Crop Exporting Countries.

CROPEC doesn't have to go very far to give us massive improvement.

We have a $(23.7) billion adverse balance of trade from our petroleum imports and our agricultural exports.

If we price these commodities on parity with crude oil we change this from $(23.7) billion adverse to $44.2 billion favorable, a swing of $67.9 billion, and if we price them on parity with gold, the balance would move to $71.2 billion, a swing of $94.9 billion.

In the OPEC cartel, it takes 13 oil exporting countries to control 86% of world crude oil exports, but the U.S. alone controls 86% of world soybean exports. In net, four countries control over 80% of all major agricultural exports and if we worked with these countries to manage world agricultural trade, we could completely offset the rising price of oil.

Meanwhile the Soviet Union has doubled its share of world gold production in the last 20 years. In 1970, one ounce of gold bought 23 bushels of wheat and 28 bushels of corn.

While in 1970, U.S. expenditures on defense were 10.7% above those of the U.S.S.R., in 1979 our defense expenditures were (34.5)% below those of the U.S.S.R.

We have been wasting our substance and neglecting this vital area of government affairs. And the results are already obvious in Iran and Afghanistan, where our only answer is to boycott the Olympics.

1% of the citizens pay 20% of all the taxes. 53% of the citizens pay only 8% of the taxes. In net, 1% of the citizens pay proportionately 133.3 times as much as 53% of the citizens. This makes it very tough to bring about much needed tax reform, particularly to encourage business investment.

Netting out all the problems that have been portrayed in the preceding, following are five actions that could dramatically reverse the declining strength of the U.S. economy, benefit all who are willing to work and provide the means of helping the disadvantaged.

Real Defense Spending
U.S. vs. U.S.S.R.

	1979 Defense Expenditures			Growth in Spending, 1970-1979		
	Billion $			Avg. Ann. % Inc/(Dec)		
	U.S.	U.S.S.R	of U.S.	U.S.	U.S.S.R.	U.S.
(1) Research, Development, Test and Evaluation	$ 14.0	$ 26.0	1.9X	(0.8)%	7.1%	7.9%pts
(2) Plant and Equipment	26.5	49.0	1.8X	(4.2)%	2.6%	6.8%pts
(3) Operations	67.5	90.0	1.3X	(2.7)%	2.0%	4.7%pts
(4) TOTAL	$108.0	$165.0	1.5X	(2.8)%	3.0%	5.8%pts

U.S.S.R. Arms as Multiple of U.S.:

Big Missiles	10X
Artillery	8X
Tanks	5X
Armored Personnel Carriers	4X
Submarines	3X
Tactical Aircraft	2X

Comparison of Media and Oil Company Profits

Line No.			(1) % Return on Total Capital 12 Months Ending Sept. 30, 1979
(1)	Dow Jones	Media Company	29.7%
(2)	Times Mirror	Media Company	22.4%
(3)	Gannett	Media Company	22.3%
(4)	Washington Post	Media Company	21.7%
(5)	American Broadcasting	Media Company	20.3%
(6)	McGraw Hill	Media Company	19.2%
(7)	CBS	Media Company	18.0%
(8)	Standard of California	Oil Company	15.8%
(9)	Exxon	Oil Company	14.1%
(10)	Mobil	Oil Company	14.0%
(11)	Standard of Indiana	Oil Company	13.8%
(12)	New York Times	Media Company	12.9%
(13)	Atlantic Richfield	Oil Company	12.3%
(14)	RCA	Media Company	12.2%
(15)	Shell	Oil Company	12.1%
(16)	Union Oil Company	Oil Company	11.9%
(17)	Time, Inc.	Media Company	11.1%
(18)	Texaco	Oil Company	11.1%
	Average Returns		
(19)	10 Media Companies		19.0%
(20)	8 Oil Companies		13.1%

Five Action Recommendations

(1) Balance the Budget over the Business Cycle

(2) Cut Top Personal Tax Rate to 36%

(3) Adjust All Personal and Corporate Profits for Inflation Before Taxing

(4) Eliminate the Capital Gains Tax

(5) Manage Agricultural Exports to Strengthen the U.S. Economy.

J. Peter Grace is President and CEO of W.R. Grace & Company. The foregoing article is derived from two presentations made by Mr. Grace; President's Night speech, Financial Executive Institute, Milwaukee, Wisconsin, and Financial Executive Institute, New York, N.Y. We are indebted ot the public relations division of W. R. Grace & Co. for the material and access to charts used.

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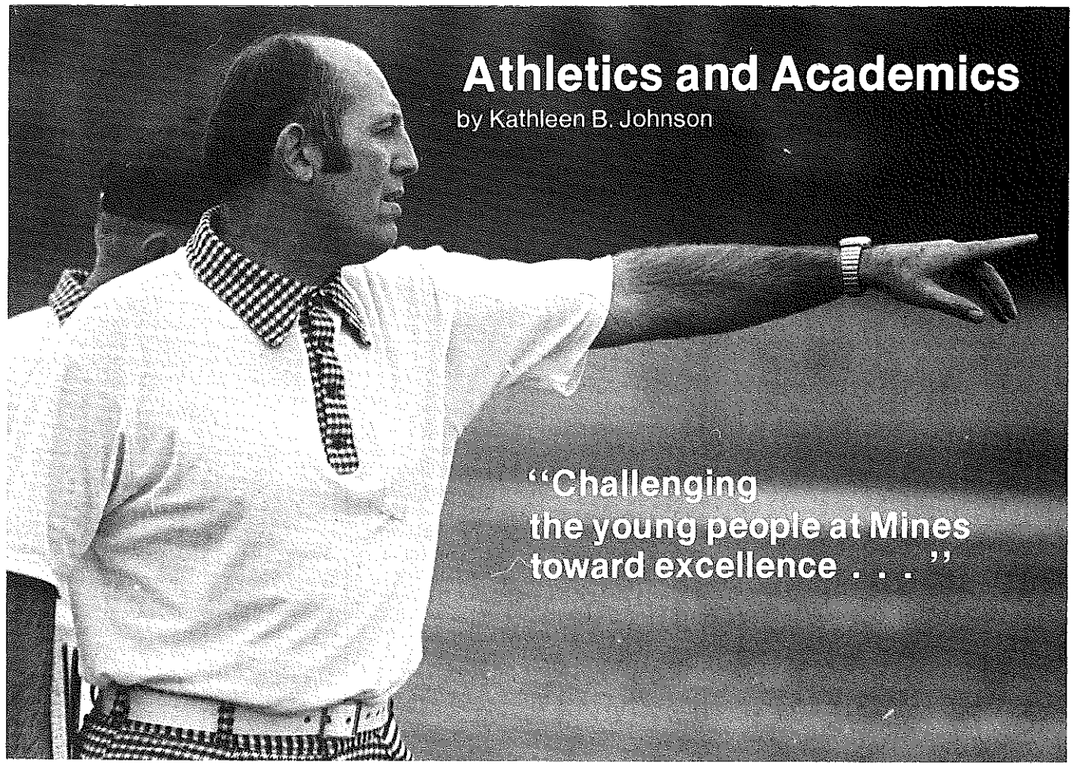
Some Directory Corrections

Shown:	Correct:
Balaef, Nikolai	Belaef, Nikolai, P.E. '27
Atterridge, David G.	Atteridge, David G., Met.E. '63
Baggy, William C.	Bagby, William C., P.E. '58
Berk, William Ian	Berke, William Ian, Geol.E. '64
Cannady, Francis X.	Cannaday, Francis X., E.M. '43
Fronapeel, Thomas J.	Fronapfel, Thomas J., BSc.Met. '79



Athletics and Academics

by Kathleen B. Johnson

"It has always been an integral part of the Mines scene." Marv Kay, head football coach for the Colorado School of Mines, was referring specifically to football with that statement, but he might have been referring to the entire Mines athletic program.

In one form or another, sports have always been a part of the Mines scene. Competition in sports began almost simultaneously with the school's founding in 1866, as seen in a photograph of Jarvis Hall taken in 1869 and now on display in the Mines library. Close inspection reveals a cricket game in progress on the lawn.

"We are very fortunate," muses Joe Davies, a 33-year veteran of coaching at Mines who retires this year, "that the administration feels athletics are important and they support us and our programs. The Board of Trustees does not want to see severe cutbacks in the program because of inflation."

According to the "History of the Colorado School of Mines" written by Mary Hoyt, the first formal recognition of athletics by the Board of Trustees came in 1882. They voted an appropriation of $50 to equip a gymnasium in the basement of the first building on campus.

That support was continued through the years and is now ingrained as a tradition of the school's administration, faculty and students.

"It's not easy to coach here," says Jim Darden, a 26-year veteran of basketball and baseball coaching. "There's always a challenge."

The biggest challenge according to the entire coaching staff, is to juggle time. Time, for academics and sports in one of the toughest engineering schools in the country, is not in abundance for either faculty or students.

"There is a great deal of respect for student athletes," believes Bob Pearson, business manager for the past 15 years, currently soccer coach and assistant in basketball. "Both faculty and students see athletics as a good release of the pressures at Mines. The students sacrifice their after school hours to participate."

The coaches agree that the Mines athlete is rare. They also agree that the Mines atmosphere is even rarer.

As Bob McCandless, swim team coach and assistant football coach, puts it, "Academics have first priority. One can attain equal excellence in both; but academics should not be an excuse for poor athletic performance, nor should athletics be an excuse for poor academic performance."

The student athlete at Mines is just that—a student *first* who also happens to participate in sports.

"If the student is not prepared in class or if he uses class as an excuse for poor athletics," continued McCandless, "then either the professor or the coach has a right to jump on him."

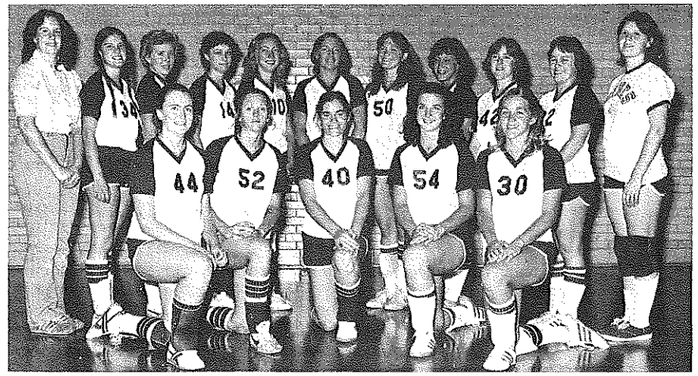
Pat Dyer, head trainer, comments that, "No one is twisting the arm of the student athlete to participate. Yet every kid, no matter what, gives the best possible."

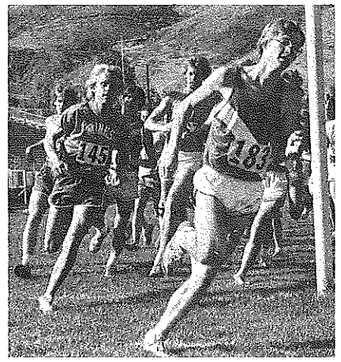
In the beginning, all games were on an intramural basis. The first games, cricket and rugby, eventually evolved into football. Baseball was already a top contender in the 1800's.

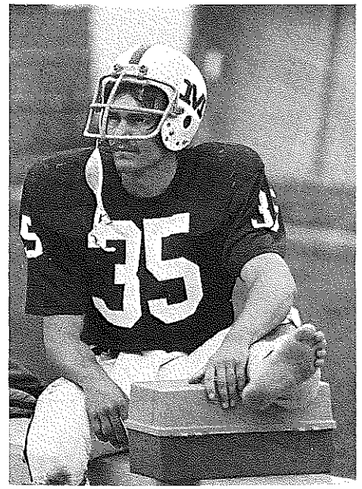
Over the years, there has been an increase in both the number of sports offered and the support they receive. The 12 intercollegiate programs offered today are football, basketball, track, cross country, baseball, wrestling, swimming, soccer, tennis, golf, skiing, and rifle. These sports, and others, are also available through intramurals.

"Today Mines has the largest men's program in the West," athletic director Bruce Allison says proudly.

A study of authoritive sources, including the National Directory of College Athletics and the Blue Book of College Athletics, reveals that Mines does indeed have one of the broadest, most comprehensive programs of physical education and athletics of any institution in the nation, devoted solely to engineering education. In many respects, it excels that offered by the majority of small and medium sized liberal arts colleges and universities.







Clockwise from left: Head football coach, Marv Kay, gestures to his team.

The 1980 volleyball team has high hopes.

Injuries are a part of football, but watching from the sidelines is no fun.

Sometimes in soccer, one just can't quite get a foot on the ball. (Photo by Mike Leach).

The final stretch of a cross country race is often the hardest part of all.

"Mines still requires four separate semesters of physical education to graduate, in a day and age when most schools have given up such requirements," remarks Bruce Allison. "Athletics is more than ever a part of the school. It is established in the minds of the Trustees, the faculty and the students."

A look around the campus will confirm Allison's opinion. Besides the collegiate and intramural activities that continue year round, one can see many impromptu and unofficial sports in progress. Skiing practice sessions, frisbee, and informal lunch hour basketball sessions are always popular. And if one looks up to the "M" on a windy day, there will likely be several brave souls hang-gliding off the top of a mountain.

"Most of the students I have talked to," states Gail Klock, the new coach this year for women's basketball and volleyball, "say they play for a break from studying. They see athletics as an important part of their social life and a way to meet new people."

The average Mines student carries between 17 and 20 hours of tough engineering courses per semester. This heavy scholastic pressure curtails the time available for practice. It also discourages some good high school athletes from enrolling.

"The students support the athletes," says Marv Kay. "The person wearing a letterjacket is respected by his peers because they know he is not a 'dumb jock.' He is not treated any differently in the classroom than the rest of them."

The Mines Oredigger teams are always high in spirit and desire, and backed by strong support from students, faculty and alumni.

"We try to be competitive, but we are not always successful," comments Jack Hancock, tennis and wrestling coach for 26 years. "At times there is a lack of support. We understand that. People are just naturally interested in a winner."

Win or lose, the Mines coaches agree that the administration has done a good job of supporting their efforts. More money and better attendance at the games would help, though.

"We have the same problems," continued Hancock, "as every business in a time of inflation and recession."

Instead of cutting out whole programs, Mines business manager Bob Pearson has followed a policy of cutting back games. Financial support comes from the state, student fees, and alumni. Many alumni buy season tickets but give them away to local residents to use, thus insuring better game attendance.

Money and win/loss records are not the only things affecting the Oredigger teams. Scheduling has become increasingly difficult as enrollment increases.

"Student participation and attendance is not as good as it could be," believes Dick Stapp, coach for track and assistant in football, "because of the increase in night classes and tests. There is also more of a commuter population among students than in years past."

All the coaches are dedicated to making the Mines athletic program lasting and rewarding to both faculty and students.

Jack Hancock is satisfied as long as the students improve and are interested.

Bob Pearson *really* believes it is "not whether you win or lose but just how you play the game."

Gail Klock cites statistics that only one percent of men and even fewer women move from intercollegiate athletics into the pros; however, the Mines students will devote years to their engineering careers.

Joe Davies feels companies are looking for well-rounded students and, along with an engineering degree, that

participating in athletics teaches one both how to lead and how to take orders.

Jim Darden believes winning is most important but one must have fun while doing it.

Pat Dyer knows sports are an integral part of any program and Mines has sports in abundance.

Dick Stapp says if you are going to compete you must compete to win, and there is no reason why Miners cannot be good athletes.

Bob McCandless is gratified by working with people who are intelligent, motivated and know what they are trying to attain, "because they will give you everything they can and you can't ask for more."

Marv Kay enjoys challenging young people toward excellence in athletics in the same way they are challenged to excellence in academics at Mines.

Bruce Allison sees Mines athletes as prepared to make sacrifices to compete because they feel it is worthwhile.

The mission of the Colorado School of Mines, according to Jack Hancock, is "to graduate the best product possible in the engineering field and to hire and maintain a faculty of the same quality."

An in depth look at the Mines athletic program points to at least partial completion of that mission.

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Denver Area Section Meetings

North—December 3, Bernard's 5390 Wadsworth Bypass, Arvada, 11:45 a.m.

South—December 4, Marriott Hotel, I-25 at Hampden, Denver, 11:45 a.m.

West—December 5, Holiday Inn West, U.S. 40 at South Golden Road, 11:45 a.m.

For more information contact Kathy Barbour at CSMAA, 279-0300, ext. 2290.

ASAP: Program for Success

Marshall C. Crouch III, President CSMAA

When a program means the difference between success or failure as an engineer or manager, it becomes more than just another program. When there's a crisis at hand, a good engineer will rise to meet it. The best of engineers will turn it into expanding opportunity.

A new program which the CSM Alumni Association is spearheading through The Resource Fund is designed to meet just such a problem at CSM: to provide much-needed financial assistance to students even as the School is at work to improve the School's educational programs. The success of the new program will be important not only for students and industry, but also for the nation as it faces its needs for mineral and energy resources.

What is the program?

The Boards of Trustees and Directors of the School, the Foundation and the Alumni Association agreed on October 1, 1980, that the CSM Alumni Association should be given the opportunity of and responsibility for organizing and directing the **Annual Student Assistance Program (ASAP)** of The Resource Fund. The old and successful Annual Alumni Development Fund (AADF) has been superseded by this new and hopefully even more successful program.

ASAP is part of The Resource Fund, which has been called "the boldest, most imaginative venture ever launched by the School in its long history." The Resource Fund seeks broad-based financial support to maintain and improve the School's standards of excellence, and has raised over $25 million through corporations, foundations and individuals since its formation in 1977 to strengthen School programs.

If success follows success, the initials of this new phase of the total resource effort indicate the program's urgency—"As Soon As Possible." The costs of keeping Mines' standards high are on the upswing, and that includes student tuition and living expenses. We cannot afford to lose gifted future engineers because they cannot afford to attend school at Mines.

You have benefited and are benefiting from a Mines education—of that there can be little doubt. Now is the time to help keep the doors open to those who will follow you toward successful careers.

What's the next step?

As you are reached in person or by mail this year, you will hear a united appeal for support for the Annual Student Assistance Program of The Resource Fund, and a firm handshake will accompany it on behalf of the students at Mines.

In October 1978, Ed Brook '23, wrote an excellent article for Mines Magazine entitled, "When Does the Other Shoe Drop?" Ed informed you of the bold move of CSM in creating The Resource Fund, the study leading to this decision, the Alumni Association's early sponsorship in the creation of the CSM Foundation, and of the aspirations of The Resource Fund in support of Mines.

As The Resource Fund progressed, Ed noted, phase two would involve individual alumni in funding efforts, and many to date have committed both funds and personal energy to that end. The new **ASAP** adds solid emphasis to and its success will strengthen that total Resource Fund effort.

Let me join with Ed in saying that, "Like the inevitable evolution of caterpillars to butterflies, I am totally convinced that Mines needs the program evolution provided by The Resource Fund if it is going to maintain its standards of excellence, expand programs in response to the needs of our nation today, and remain the number one mineral engineering school in the world."

Mines needs to be in the forefront of the creative engineering genius that will be required to find the step-by-step solutions to the energy and mineral crises that are in fact here. We'll be needing your assistance with **ASAP** to get the job done.

What do we want to do with this money?

We've already mentioned the student cost crunch. We'd like to provide a student loan and grant source to enable deserving and hard-working students in need to continue their studies at CSM. If we can establish a successful program over perhaps a 10-year period, with careful administration, the program will become self-supporting and revolving.

We'll be asking you and other graduates to make a multi-year commitment to The Resource Fund through **ASAP.** Your commitment is really an investment, both in the future of our mutually shared endeavors in resource development and in the strength of your degree from Mines.

Alumni Association volunteers will be in touch with Section leadership in every area, with details and to invite each alumnus to participate.

As the program progresses, you will be kept informed of our advances toward our goals. This is very much *your* program as a graduate. Its success depends upon you and upon all of us.

When you are called upon by an Alumni Association volunteer, please think back to what your degree from Mines has meant to you toward your personal success and well-being. The success came in large measure through having met the rigors of a Mines education. Meeting this challenge with a generous response will help Mines meet its tremendous responsibilities toward this student generation and, with continued support, for generations to come.

The Annual Student Assistance Program of The Resource Fund is the right program at the right time to strengthen CSM and all of resource engineering. Join with us in supporting the Annual Student Assistance Program with your fair share and commitment. With the nation, we'll all share in its success.

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alumni update

1898 A story about Orville Harrington, E.M., deceased 1946 taken from the Denver Post. A graduate of the School of Mines and one-time director of the Alumni Association, Harrington worked as a miner foreman in the refinery section of the U.S. Mint in Denver. A man with a wooden leg and high ambitions, he devised a plan to fulfil his dreams for himself, his wife and his two children.

In September, 1919, he made a trial run and it worked. Stories differ as to how he managed, between September and Christmas, to secret from the Mint, almost $100,000 in gold bullion.

Some say he carried the gold bars out under his coat, but the most popular theory is that he stashed them in a hollow of his wooden leg.

Once he had enough gold bars, he planned to lease an abandoned gold mine, melt down the gold with ore, and then proclaim he had found a new strike.

But he got careless and got caught.

The secret service had known for weeks that gold was disappearing but had no clues until Harrington triggered a trap. He was caught red-handed, or heavy-footed in this case, and taken to jail.

Everyone thought Harrington would get a light sentence because of his complete cooperation with the authorities. Even the secret service agent admitted that he would never have found the gold behind a brick wall in Harrington's basement without his cooperation.

The Denver Federal District Court Judge, however, felt differently. "Ten years hard labor at Leavenworth.

A reporter asked Harrington why he did it. His reply: "Most people enter into any enterprise with a desire for independence. I had ambitions for my family. What right-thinking man doesn't?"

Brown

'22 George R. Brown, E.M. and Hon. Dr. Engineering '62, has been elected an honorary director of Texasgulf Inc. Mr. Brown served as an active director of TG from 1952 to 1957. Together with his brother Herman, George Brown was a founder of the world-famous construction company of Brown & Root, Inc. Formerly chairman and chief executive of Texas Eastern Transmission Corporation and chairman of the board of Brown and Root, Mr. Brown is now retired from these positions. He maintains, however, an active role on the boards of Halliburton, Texas Eastern and First City Bancorporation, and is trustee and president of the Brown Foundation. It was through the Brown Foundation, formed in 1962, that Mr. Brown gave funds to CSM for the construction of the impressive new facility, the George R. Brown Mining and Basic Engineering Building.

'32 Dr. James Boyd, MSc.Geop., Phd.Geop. '34 and Hon.Mem. '67, addressed delegates at a mining symposium on Air Environmental Problems in September. He is a highly reputed mining consultant and former director of the U.S. Bureau of Mines.

'35 Robert W. Price, E.M., retired May 1, 1980 from his position as senior vice president of Mountain States Mineral Enterprises, Inc. in Tucson, AZ.

'37 P. C. Templeton, P.E., after over 40 years of service, has retired as manager of Texaco's Puget Sound Plant at Anacortes, Washington. He continues to reside in that town.

'38 Al Nesbitt, E.M., retired Col., U.S. Army, recently sent clippings from the Seattle Times and Skyword, the Pacific Western Airlines inflight magazine, August, 1980. All dealt with various aspects of the mining industry in the Puget Sound area of Washington. One referred to a Washington engineer who believes those wanting to learn a trade must do so "on the job" because higher academic avenues are not "sufficiently practical" to teach the technologists!

'53 George W. Mitchell, E.M., has resigned as director of the CSM Alumni Association. He has joined Fugro Rocky Mountain, Inc. in Golden, as their director of marketing. **Phinn W. Townsend, P.E.,** has been elected President of Saga Petroleum U.S. Inc. in Houston. He was formerly that company's executive vice president.

'54 Robert Kendrick, E.M., has been promoted to vice president—development for AMAX's Climax Molybdenum Company. He was previously vice president and general manager of the Climax Mine near Leadville, Colorado.

'58 John T. Corson, Geop.E., is now in Addis Ababa, Ethiopia, as public administration service sanitary engineer for the Water and Sewerage Authority.

'59 Gary E. Melicklan, Geol.E., is director of planning for Dames and Moore. He had been that company's director of mining.

Templeton

Smallwood

'60 Quentin T. McGlothlin, P.R.E., has been named account representative for the New Business Development Division of Exxon Chemical Americas' Specialties Department. He has been with Exxon since his graduation. **Norman J. Smallwood, E.M.,** formerly vice president of technical services for Lou Ana Foods, Inc., has joined A. E. Staley Mfg. Co. as superintendent of their vegetable oil refinery currently under construction adjacent to the firm's Des Moines, Iowa, soybean mill.

'61 Reginald Worsley, MSc.Min., is currently with Canadian Equipment Sales & Service Co., Ltd. in Calgary, Alberta.

'66 George H. Covington, Geol.E. and MSc.Geol.E. '68, is currently district exploration geologist for Union Oil Company of California and located in Casper, Wyoming.

James W. Colzani

'67 James W. Colzani, Met.E., has been appointed general superintendent of the Coke and Steel Division for the Pueblo Plant of CF&I Steel Corporation. He was previously superintendent of Steel Production. **John N. (Nick) Teets, Met.E.,** formerly vice president of the Wilkinson Company, is now president of that company in California.

John N. (Nick) Teets

'68 Gregory H. Hoyl, E.M., joined Massey Coal Terminal Corporation, Richmond, Virginia, as resident engineer. He had been vice president and general manager of Sun Coal Company, a division of Massey, in Milner, Colorado.

'70 Jon N. Dull, P.E., previously a staff engineer, has been named senior engineer for Worldwide Energy Corp., based in Denver. **Robert C. Scharp, E.M.,** has been promoted to manager of Kerr-McGee Coal Corporation's Jacobs Ranch Mine near Gillette, Wyoming. He had been manager of operations development for mining operations, headquartered in Oklahoma City. **Gregory A. Cone, BSc.Geop.,** is currently patent attorney for McDonnell Douglas Corporation after completing his J.D. degree at the UCLA School of Law in 1976.

'71 Stefan P. Choquette, BSc.Pet., was mistakenly listed in the 1980 Directory as deceased. We apologize for the error. We believe him to be in Europe. If anyone knows his exact whereabouts please inform the Alumni Records office.

'74 Patrick A. Ley, BSc.Math, formerly computer application engineer for Dames and Moore, is now technical representative for Boeing Computer Service. **Thomas M. Deputy, Hon.Mem.,** has been promoted to Lieutenant Colonel, U.S. Army and is based in the Pentagon. **William K. Dalton, BSc. Geop.,** is presently employed by Action-Peace Corps as a rural technician in Fiji, South Pacific. **R. Mark Maslyn, BSc.Geol. and MSc.Geol. '77,** is currently self-employed as a consulting geologist in Computer Applications in Exploration Geology in Golden.

'75 Thomas L. Breninger, BSc.CPR, has been promoted from process engineer to gas plant superintendent for Marathon Oil Co. in California. **Andrew P. Schissler, BSc.Min.,** is currently chief engineer for Empire Energy Corp. in Craig, Colorado. **James C. Hasbrouck, BSc.Geop.,** has joined Gulf Mineral Resources Co. as a geophysicist in their headquarters office in Denver. He was previously employed by geoMetrics of California.

'76 F. Otis Booth, III, MSc.Geol., is now purchasing industrial engineer for California-Portland Cement Co. **David B. Mairs, BSc.Min.,** has been promoted to technical service representative, head office, for C-I-L Inc., Explosives Division, in Quebec. **William E. Richardson, BSc.Geol.,** is employed as petroleum engineer with Nielson Enterprises Inc. in Denver.

'77 William A. Sargent, BSc.Pet., has been promoted from staff reservoir engineer to associate reservoir engineer and transferred from Texas to England with Phillips Petroleum Company. **William J. Engelhard, BSc.CPR,** was recently named plant manager of Temperature Processing Co., Inc. in Denver. He had been with Kaiser Magnesium as staff metallurgist. **Michael Glade, BSc.Min.,** is attending Lewis and Clark College of Law in Portland, Oregon. **Charles L. Murphy, MSc.CPR and PhD.CPR '79,** is with Conoco, Inc. in Ponca City, Oklahoma as research engineer.

'78 Mark Coolbaugh, BSc.Geol., formerly of Climax Molybdenum Company in Colorado, has joined the Mount Emmons Project as an associate geologist for AMAX, Inc.

'79 S. Phillip Rogers, PhD.Min.Econ., is now senior mineral economist-mining division for Bendix Corp. in Grand Junction, Colorado. He had been with Mining & Mineral Resources Research Center as assistant to the director. **John Hissem, BSc.Min.,** previously with Petro-Mineral Exploration, Inc., is now a geologist for Concord Minerals Corp. in Golden. **Kenneth J. Danti, BSc.Phy.,** is working as a process engineer for Texas Instruments in Dallas.

'80 John Charles Barbour, BSc.Phy., is attending graduate school at Cornell University, Ithaca, N.Y. He has received a research grant from Cornell.

Proposed Officers and Directors, CSMAA 1981

President—*one year term*

THOMAS M. SMAGALA, BSc.Geop. 1974, is Manager, Geology-Geophysics, Rocky Mountain Southern Region for Pendleton Land and Exploration, Inc., Denver, CO. Prior to that he worked for Kansas-Nebraska Natural Gas as Manager-Geology. Smagala has served as Secretary, Treasurer and is completing a term as Vice President for the Alumni Association.

Vice President—*one year term*

RICHARD A. DANIELE, Met.E. 1960, is Manager, Non-Ferrous Pyrometallurgy Processes with Dravo Corp. in Denver. Daniele has been located in Denver since 1973 when he was transferred here from Pittsburgh to set up the Denver office. Prior to that, he was a Metallurgist with Kennecott Copper. He has been a consistent member of the Association since graduation, has served as Secretary of the Alumni Association and is completing a term as Treasurer. He lives in Denver.

Treasurer—*one year term*

ROBERT T. REEDER, E.M. 1949, MSc.Min.Econ. 1976, is presently Associate Professor for CSM Mining Engineering Department. He has extensive experience in mine production administration. Reeder is owner and President of the Remenco Corp., a mining engineering and management consulting company. He has been a member of the Alumni Board as a Director, 3-year term, and is completing a term as Secretary.

CSM Foundation Director—*one year term*

MARSHALL C. CROUCH, III, Geol. E. 1967, is an oil and gas exploration consultant. Prior to that he worked for Plains Exploration, The U.S. Army, Cardinal Petroleum and Kansas-Nebraska Natural Gas Company. He has served on several Alumni Association committees. Crouch served a 3-year term as Director of CSM Alumni Association, 1-year terms as Secretary, Treasurer, Vice President and is completing a term as President.

Secretary—*one year term*

EDWARD M. WARREN, Geol.E. 1950 is presently vice president of Petrolero Corp. He was formerly with Texaco Petroleum Research Corp., Sutton Companies, H. J. Parker, independent and consultant. He is a Certified Petroleum Geologist #2024, AAPG and a Certified Professional Geological Scientist #3936, AIPG. Warren has been a member of the CSMAA for 30 years, since his graduation, and has held several offices in the South Texas Alumni Section. He has lived in Evergreen for the past 4 years.

Secretary—*one year term*

LEO BORASIO, E.M. 1950 is Chief Engineer of the Mining and Metallurgical Division of Stearns-Roger and has been with Stearns since 1951. He served in the U.S. Air Force as aircraft armament instructor and as a commissioned officer, Corps of Engineers, in World War II. Borasio is a registered Professional Engineer with the State of Colorado and has one publication: "How Plant Models are used to Design Mineral Processing Plants." He is a class agent and has been a member of the CSM Alumni Association for 30 years, since graduation. He resides in Denver.

Director—*3 year term*

MAX E. COATS E.M. 1935, was a mining engineer with ASARCO, Inc. for 41 years. His experience includes: controlled chemist and assayer, assistant superintendent, ore buyer, superintendent and manager. Max retired in 1976. He has served the Alumni Association in Placement Service and is on the Board of Colorado Mining Association. Coats served in WW II in the Corps of Engineers, U.S. Army at the rank of Lt. Col. He resides in Arvada.

Director—*3 year term*

ANTHONY F. CORBETTA, Met.E. 1948 went to work for CF&I immediately after graduation and is still with them; presently as a sales representative. He lived in Denver for 2 years, then in Grand Junction until 1960, at which time he returned to Denver. He is Registered Professional Engineer in Colorado and a member of AIME. Corbetta is a past president of the Denver Section, a past chairman of the Alumni Membership Committee and a member of the Association since 1948.

Director—*3 year term*

VICKI J. COWART, MSc.Geop. 1977 is an exploration geophysist with Mobil; offshore California and the Rocky Mountain Basins. She graduated from Polytechnic Institute with distinction and moved to Golden in 1975. She has one publication: "Mossbauer Spectroscopy Investigation of Clinker Rocks." Cowart was the founding president of the Denver Chapter of the Association of Geophysical Scientists and now resides in Denver.

Director—*3 year term*

LEE ANN MARX, BSc. B.E. 1976 is a native of Denver. She has been with Gates Rubber Co. since graduation. Marx is now a project engineer—belts and equipment engineering. She is a past president of the Denver Section of the Society of Women Engineers and has held various offices in the Society of Automotive Engineers of Colorado. Currently a director of the Colorado Engineering Council, she is active in community affairs and a member of the Professional Engineers of Colorado. She has been a member of the Association since graduation and resides in Denver.

Director-at-Large—*2 year term*

GARY L. NYDEGGER, BSc.Geol. 1974, MSc.Min.Econ. 1978 is an oil and gas exploration consultant and has recently opened an office in Denver for Mormac Oil and Gas Co. of Corpus Christi, TX. Prior to that he worked for Kansas-Nebraska Natural Gas Co. He has been chairman of the CSMAA Membership Committee and is presently chairman of the Placement Committee. Nydegger receives his master's degree while attending CSM part-time and resides in Golden.

Director-at-Large—*2 year term*

STEWART G. SQUIRES, BSc.Geop. 1974, is a Geophysicist for Kansas-Nebraska Natural Gas Co., Inc., Lakewood, CO. After graduation from Mines he served with the U.S. Army Corps of Engineers and was employed by Kansas-Nebraska as a geologist. He has been active on the CSMAA Membership and Finance Committee and is presently chairman of the Publications Committee. Stew lives in Littleton.

in memoriam

Alfonso C. Savage

Alfonso C. (Switsavage) Savage, E.M. 1932, died of cancer on June 7, 1980.

While at Mines he was a member of Alpha Tau Omega fraternity. He later worked for New Jersey Zinc Company.

He is survived by his wife who resides in Ogdensburg, New Jersey.

Holton C. Kearny

Holton C. Kearny, BSc.Min. 1975, died July 9, 1980. He was working on his thesis at Mines to obtain a master in Mineral Economics at the time of his death.

Born in San Antonio, Texas, in 1953, Kearny's family moved to Colorado Springs in 1965. He graduated from Mines in 1975, having been on the CSM swim team for four years, most valuable swimmer two years, captain one year, and outstanding senior athlete.

During the summers of his college years he worked for Consolidated Coal Company and AMAX Henderson Mine. Upon graduation he became sales engineer for Ingersoll-Rand Company in New Jersey. In 1977 he moved to Alabama to work for Cowin and Co. as an engineer. Between 1978 and 1980 he was miner and section foreman for Snowmass Coal Co. in Carbondale, Colorado.

He was a member of AIME, Theta Tau, and past-president of Alpha Tau Omega social fraternity.

Surviving are his mother and two sisters.

Malcolm E. Collier

Malcolm E. Collier, E.M. 1922 and Hon. Mem. 1966, died August 28, 1980, at Lutheran Medical Center in Denver. He was 80 at the time of his death.

A native of Denver and veteran of World War I, Collier graduated from Mines in 1922 and the University of Colorado School of Law in 1925. He was a practicing attorney until 1971.

From 1939 until his retirement in 1971, Collier was president of First Federal Savings and served as a director from 1925 to 1979. He was president of the Savings and Loan League of Colorado in 1942 and 1956 and a director of the Federal Home Loan Bank Board of Topeka, Kansas, in 1943 and 1944.

Collier was a member of the Colorado House of Representatives 1933-1934 and the Denver Election Commission 1934 to 1940. He served on the board of directors of the Lakewood and North Table Mountain Water and Sanitation Districts and on the Jefferson County Board of Adjustments.

For a number of years he served as treasurer of the CSM Alumni Association. He received the Alumni Award of Merit from the School in 1965. In May, 1980, he was honored with a scholarship endowment in his name at the School.

He was a member of Sigma Phi Epsilon fraternity, the Colorado Bar Association and the Denver Masonic Lodge.

Surviving are his wife, the former Kathleen Watts of Brighton, Colorado, two daughters, one son and three sisters.

David H. Singer

David Horace Singer, Geol.E. 1950, died on January 20, 1979, at the age of 56.

Singer was born in Warren, Ohio, and attended college in Youngstown, Ohio. In 1947 he received a degree in Chemistry. During his years in college he took time off to work for several steel companies in Ohio. After his graduation from Mines in 1950 he joined Arkansas Fuel Oil Corporation in Shreveport, Louisiana. He was a staff geologist in their Development Department. He later worked for Cities Service Oil Company's Exploration Department in Tulsa, Oklahoma.

He is survived by his wife, Ellen, who resides in Winter Park, Florida.

Jaroslav Malkovsky

Jaroslav Malkovsky, DSc. 1930 and Medalist 1968, died in Prague, Czechoslovakia, on February 2, 1980 after a short illness.

He was born in Czechoslovakia, and after graduating from Mines returned there to begin his career. He joined CKD Engineering Company, Ltd., Prague, as a production engineer.

In 1940 he became production manager, nonferrous secondary smelter, for Runa Ltd. He was head of the department of nonferrous metallurgy for the Association of the Czechoslovak Industry, and in 1948 he was head of the scientific department for Nonferrous Metals Research Institution.

His career turned to teaching in 1950 when he became director of the Institute of Metallurgy for the Czechoslovak Academy of Science. At Technical University Kosice he was first Dean of Students, then Dean of the Metallurgical Faculty, and finally head of the Department of Nonferrous Metallurgy.

Malkovsky is the author of several textbooks and over 63 scientific and professional papers on extractive and physical metallurgy of nonferrous metals, history of nonferrous metallurgy in Czechoslovakia and others.

He is survived by his daughter.

Frank J. Stortz

Frank J. Stortz, E.M. 1923, died May 16, 1980, at the Veterans Administration Hospital in Birmingham, Alabama, after a long illness.

He was retired from the U.S. Army as a Lt. Colonel after 34 years of service. For 25 years he worked for the Bureau of Mines; four and one-half of those years were spent in Colombia on the President's Point Four Program. He also served as a consultant to the United Nations, and held a masters degree in mine engineering from the University of Edinburgh, Scotland.

Surviving are his wife, two sons, and two grandchildren.

Adolph W. Pfeil

Adolph W. Pfeil, P.E. 1927, died in November, 1978, after an illness of two months.

He was born on February 18, 1904, in Golden, and attended Golden elementary and high schools before entering Mines. Upon graduation he joined Richfield Oil Co. in Long Beach, California, as a chemist.

He remained in California and worked for Del Rey Oil & Gas Co. as a field superintendent and Union Oil Co. as a production foreman. In 1944 he joined the State of California, State Lands Division, and was assistant executive officer for that division at the time of his retirement in 1968.

He was a member of the California Farm Bureau, Fallbrook Gem and Mineral Society, Fallbrook Citizens' Planning Group, and a professional petroleum engineer in the state of California.

He is survived by his wife, Mary Jane, who resides in Fallbrook, California.

Paul S. Lewis

Paul S. Lewis, Geol.E. 1929, died on May 26, 1980. He was 77 and had been retired from Humble Oil & Refinery since 1968.

After his graduation from Mines he went to work for E. W. Marland Co., Inc. in Ponca City, Oklahoma. In 1934 Lewis went to work for Exxon as a laborer in Houston, Texas. He remained with that company until 1966 when he retired from his position as exploration specialist in Corpus Christi, Texas.

He was a member of Beta Theta P, Theta Tau and Tau Beta Pi.

He is survived by his wife in Corpus Christi, Texas and two daughters.

William H. Johnson

William H. Johnson, Jr., E.M. 1952, died suddenly August 1, 1980, in Salt Lake City, Utah, hospital after a short illness.

He was born August 22, 1926, in Hoquiam, Washington. After graduating from high school he enlisted in the Air Force. When he returned from overseas, he graduated from Grays Harbor College. On a football scholarship, he entered Mines in 1949, and was active in football, basketball, boxing and the Sigma Phi Epsilon fraternity. He was an active member of the Alumni Association until the time of his death.

Johnston worked for Texasgulf for 27 years and was considered an expert in the Frasch Sulphur mining process and in chemical tank car design.

He is survived by his wife, the former Lillie May Vohs, two sons, a brother, a granddaughter, and several other relatives.

Our thanks to William H. Johnston, III, BSc.Min. 1978, for the above information about his father.

John C. Couch

John C. Couch, BSc.Math 1974 and BSc.Min. 1975, died on June 30, 1980, in Dallas, Texas, from diabetes.

During his college years he worked as an intern for W.R. Grace & Company, Consol—Central Division, and Johns-Manville. After his graduation he joined Bethlehem Mines Corp., Panther Valley Division, in Tamaqua, Penn. At the time of his death he was employed by Phillips Coal Company as staff project engineer in Dallas, Texas.

He was a member of AIME, SME, and a Colorado engineer-in-training.

He is survived by his wife, Joyce, of Dallas, Texas.

Uranium Technology

Many people find themselves confused on the issue of nuclear energy as they are assailed by conflicting reports and opinions throughout the media and industry.

The Colorado School of Mines Continuing Education Office has a way out of that double bind—"Uranium Technology, An Introductory Two Day Short Course," to be offered November 6-7 and December 11-12.

This intensive course examines the nuclear fuel cycle from exploration, mining, milling, enrichment and fabrication to fuel use in reactors and on to waste disposal options. The front-end aspects of the fuel-cycle—exploration, mining, milling and their related environmental aspects—are emphasized.

Now in its third year, this course has been updated to reflect changes in issues, technologies and federal legislation affecting uranium supply and demand.

The course is based on a nonmathematical understanding of nuclear physics and reactors, then goes on to provide a comprehensive understanding of the three initial steps in the fuel cycle.

Exploration—How is an exploration program organized? What are the roles of geology, geochemistry, and geophysics in locating uranium concentrations? What instruments are used? How do they work? How are aerial, surface, and subsurface data collected, integrated, and analyzed?

Mining—What constitutes a mineable ore body? What recovery method should be used? Conventional mining—open pit and underground—is contrasted with solution mining, heap leaching and byproduct recovery from phosphate and copper—the current unconventional techniques.

Milling—Alternative processing methods are examined.

Environmental issues related to mining and milling are covered in detail. How do mining and milling affect the health of employees and the nearby public? What is the natural radiation background? How is radiation measured? What do "millirem," "picocurie" and "working level" mean? Is there a safe level of radiation exposure? What are the biological effects of ionizing radiations? How can radiation be controlled in mining, milling, and tailings disposal? In addition to these environmental issues, the roles of the federal regulatory agencies, EPA and NRC, are examined.

Lectures are supplemented with relevant films and much of the course data presented as slides is provided as handout material. All data used are documented for further reading.

The lectures provide an overview and basic understanding of current technologies and issues related to the uranium industry. Professional technical personnel have found this course useful to gain a broader perspective of industry and public concerns. The course has been structured primarily for nontechnical professionals as diverse as attorneys, economists, government officials, executives, and secretaries.

The fee per participant for each 2-day course is $230.00. This charge includes registration, coffee, lunches, a reception, text, and handout material. A 10 percent discount is offered to organizations sending three or more participants to the same class. Certificates are awarded to those completing the course.

Participants receive 1.5 Continuing Education Units upon completion of the course.

The short course was developed and is presented by Dr. Jerome G. Morse, adjunct associate professor of physics at Colorado School of Mines. Dr. Morse is a fellow of the American Nuclear Society and consultant to the nuclear industry, state and federal energy agencies. He is co-editor-in-chief of the *International Journal of Uranium* and his recent publications include "Nuclear Methods in Mineral Exploration and Production" (1977) and "Energy Resources in Colorado—Coal, Oil Shale and Uranium" (1979).

Registration should be received one week prior to the date of the course. Make checks payable to "Colorado School of Mines."

Mail to: Director of Continuing Education, Colorado School of Mines, Golden, Colorado 80401. Telephone: (303) 279-0300, ext. 2321.

If there is insufficient enrollment, CSM reserves the right to cancel the course. Cancellation after one week prior to course will be subject to a $50.00 charge.

—mm—

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

The Bureau of Mines is currently accepting applications for the position of:

Director, Division of Analytic Studies
Washington, D.C.

Senior Executive Service (General)
Salary Range: $49,198-$50,112.50

The incumbent of this position will be the Director, Division of Analytic Studies. The Division is responsible for (1) continuous identification and analyses of nonfuel mineral issues that impact on national needs, particularly those having economic, social, and security implications; and (2) analytical studies of short and long-term issues which relate to the supply and demand of nonfuel minerals. The Division is the focal point for the development of nonfuel mineral policy options for meeting our national needs.

To be considered for this position, candidates must have demonstrated managerial experience. In addition, he/she must possess education as an economist and experience as a physical scientist or education as a physical scientist and experience as an economist. All applicants must be U.S. citizens.

The candidate selected will be required to file a Financial Disclosure Report.

Personal Qualifications Statements (Standard Form 171) are now being accepted by:

Chief, Section of Classification and Employment (C)
Branch of Personnel
2401 E Street, N.W.
Washington, D.C. 20241

Applications must be received in this office no later than November 28, 1980.

An Equal Opportunity Employer

Denver Area Section Meetings

North—December 3, Bernard's, 5390 Wadsworth Bypass, Arvada, 11:45 a.m.

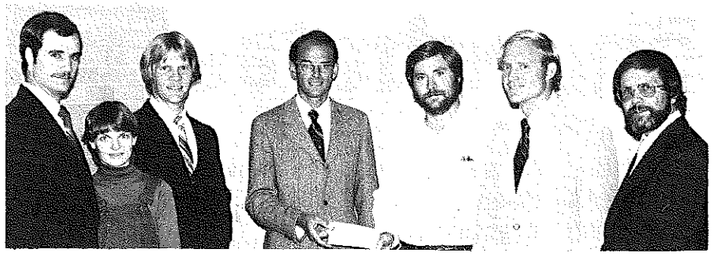
South—December 4, Marriott Hotel, I-25 at Hampden, Denver, 11:45 a.m.

West—December 5, Holiday Inn West, U.S. 40 at South Golden Road, 11:45 a.m.

For more information contact Kathy Barbour at CSMAA, 279-0300, ext. 2290.

Excess Heat From Coors

by LecClier Smith and Brodie Farquhar



From left to right are students Tom Netzel, Wanda Eaton and Drew Detamore (who will conduct the feasibility study), Dr. Dendy Sloan (who will supervise the students), Coors engineer Sam Baxter, Chuck Hahn—director of process development at Coors, and CPR head Dr. Philip F. Dickson.

An untapped resource could eventually heat the Colorado School of Mines and 4,000 homes in Golden—the waste industrial process heat from the Adolph Coors Company.

The Colorado brewery is sponsoring a proposal to recover its waste heat, in an effort to make the Colorado School of Mines and the City of Golden more energy efficient. Three CSM students, Wanda Eaton, Drew Detamore and Tom Netzel, enrolled in a chemical petroleum-refining engineering design class under the supervision of Dr. Dendy Sloan, will conduct this study.

In appreciation of the student study, Coors has presented the chemical and petroleum-refining department with a check for $5,000—an unrestricted grant to be distributed to students in the department to offset this year's tuition increase.

The CSM students are considering a variety of methods to recover the waste heat. Meeting weekly with Sam Baxter, an engineer at Coors, the students hope to finish their feasibility study by the end of this semester. In that study, they will have to answer such questions as what geographical area could be served, what process should be used to recover the energy, and the cost and return on investment to Golden users and to Coors.

Currently, the waste steam heat at Coors is being condensed into water, at the rate of 175,000 pounds of steam pressure per hour. Technically, notes Dr. Sloan, that's enough energy to supply the needs of 12,000 homes a year, or the Mines campus and 4,000 homes per year. The CSM campus would require approximately 40,000 lb./hr. of steam.

RCC Adjusts Mission

In an administrative move announced last week, the scope and the mission of the Resources Communication Center (RCC) of the Colorado School of Mines has been shifted from an external to an internal focus.

"Previously, the thrust of the RCC has been to visually document concerns of mineral and energy development in Colorado and the west," said President McBride. "Under a contract with the Colorado Legislature, the RCC produced three films in this area."

When the contract with the Legislature was completed, the RCC sought contractural work with various governmental agencies. Most such contracts were of a short-term nature, noted McBride.

According to John Golden, dean of Graduate Studies and Research Development, the Center will now focus attention on CSM itself, to be used as a teaching support, recording lectures and performances, and advancing the internal needs of the School. "The funding problem still has to be resolved," said Golden, supervisor of the RCC.

Golden noted that current contracts will be honored and work concluded for current projects. He also pointed out that the staff of RCC will be cut back to two positions.

Bob Rubin, director of the RCC, has resigned his position to consider offers of other employment in the Denver Metro area.

Scholarship Winner

John S. Hird is one of 50 students who received the 1980 Texasgulf Scholarship of $3,000 to aid in covering the educational costs of the college of his or her choice. Hird chose the Colorado School of Mines.

The scholarships are open to children of any full-time Texasgulf employees with academic excellence. Hird's father, Jack, works in administration at Texasgulf's Lee Creek operation in North Carolina.

A member of the Society of Distinguished American High School Students, Hird's interests include membership in his Student Council, Future Teachers of America and Future Farmers of America. He was a photographer on the school annual staff and a pitcher on the baseball team for four years.

Scholarships

by David Smith-Garbett

Response to the call for increased support for student financial aid at Colorado School of Mines has taken numerous forms since the beginning of 1980, according to E. Russell White, director of The Resource Fund. Increased support has come through endowment funds, increased support for continuing programs, and the commitment of new long-term funding for student financial assistance. Substantial new support is being sought in light of recent tuition increases.

Malcolm E. Collier Scholarships: Established in memory of Malcolm E. Collier, Sr., president and a director of First Federal Savings and Loan of Denver for over fifty years, the endowment will provide scholarships for students of demonstrated need. Mr. Collier was a 1922 graduate of CSM and recipient of the Distinguished Service Award in 1965.

Kaiser Aluminum Scholarships: Formed to put Kaiser Aluminum and Chemical's scholarship fund fellowship program on a "permanent and continuing basis," the endowment will place special emphasis upon providing aid to well-qualified minority students and women.

Stephen and Anna Hui Endowmed Fellowships: Established by Stephen S. F. Hui, CSM Medalist and 1940 master's recipient in geological engineering, and his wife, the fund will provide fellowships for graduate students at CSM holding undergraduate degrees from universities in Hong Kong, the Republic of China or the People's Republic of China who wish to pursue advanced studies in mineral engineering at CSM. Twenty students from the region are currently enrolled at CSM.

Robert H. Sayre Scholarships: Robert H. Sayre, Jr., and his wife Bonney McDonald Sayre, established an endowment in the memory of his father for scholarships for "deserving bright achievers" at CSM. Robert H. Sayre, Sr., contributed extensively to the international minerals community during his lifetime. He served as a Trustee at CSM from 1924 to 1936 and as President of the Board for two terms.

Robert H. Sayre, Jr., is a 1934 graduate in mining and geology. He received CSM's Distinguished Achievement Award in 1978.

The following funds are also new or were recently increased:

R. C. Baker Foundation Petroleum Engineering Scholarships: Increased support was received for this program of long standing to meet rising expenses of recipients.

Massey Foundation Scholarships: Newly established, the fund will provide scholarships for students demonstrating the leadership potential for contributing to the U.S. coal industry.

Union Oil Company Foundation Academic Scholarships: A new fund established to assist and encourage outstanding women and minority students in their studies at CSM, this long-range program is in addition to the Foundation's Departmental Scholarship Program, which also received increased support this year.

Litton/Western Geophysical Scholarships: This first-time contribution to the scholarship effort will provide scholarships for the coming year.

White noted that the overall scholarship and fellowship program has grown through the outstanding assistance of a number of volunteer fund-seekers.

These participants in the scholarship access join over 75 companies, associations, and foundations, as well as numerous individuals who are providing substantial support to CSM through the financial aid program.

CSM Rugby Club In 14th Year

The Colorado School of Mines Rugby Club is approaching the end of its 14th successful year on campus. The club fields two sides every weekend in the fall and spring seasons and currently plays in the A-2 division of the Eastern Rockies Rugby Football Union (ERRFU). The club placed second in the division in 1979 and was 14-4-1 for the '79-80 year. Mines is a strong contender for first in the division this year and has a large number of experienced returning and transferring players.

The club is exactly that, and is supported by funds from student council, not the athletic department, plus dues from the members of the club. Members

of the club buy their own jersey, shorts and rugby boots in addition to dues and expenses for travel and lodging for away games. Dues go mainly for the post-game "refreshments" traditionally provided after each home game and the post-season party for the club. Balls, field equipment, and medical supplies are taken care of through school funds.

The club started in the spring of 1967 by Marv Kay (EM '63), present head football coach at Mines, and Ron (EM '69) and Bob ('EM 70) Bills. Mines was the first rugby club in Colorado and played the first game in Colorado against the CU club. Mines won 9-3. They also won the other two games, pitted against CU that spring. Mines was one of the charter members in the Eastern Rockies Rugby Football Union in the spring of 1968. That same spring Mines won the first Coor's Cup denoting the top team in ERRFU. In the fall of 1968 Mines won the first seven-a-sides tourney in ERRFU.

In 1967, this hardy group revived the sport of rugby on the Mines campus. Some familiar faces are still around—Billy Mitchell and Marv Kay, both faculty members at CSM. Rick Carlson is a graduate student and coach of the current ruggers. Photo: Courtesy of Rick Carlson.

The Mines club has always fielded a team in the fall and spring seasons but, until recently, has traditionally been stronger, both in numbers and ability, in the spring because of the influx of football players in the spring season. During the last two or three years the club has established a strong core of approximately 20-25 experienced players that assure the club consistently strong teams in both the fall and spring.

The club has been coached in the past usually by the most experienced players on the team such as Marv Kay and the Bills Brothers but has had help from faculty members such as Bill Astle (Math Dept). The club is currently coached by Rick Carlson (Met.E. '70) a grad student at Mines and a member of the original 1967 team.

CSM Sports Update

Football

Marv Kay is not a happy man after losing to Southern Utah, 20-17.

"I don't mind losing as much as giving the game away," lamented Kay, with a bitter-sweet memory of being 17-7 ahead of Southern Utah, four minutes into the fourth quarter.

The SUSC Thunderbirds came roaring back and quarterback Dave Mollica hit Mike Scheiss on a 12 yard pass play for a touchdown. The extra point kick was blocked, and the T-Birds were four points and 2:34 away from victory.

CSM quarterback lost a pass to SUSC's Dave Faddif, which set up SUSC for the winning TD. Mollica passed for one first down, ran for the next and then hit Mark Holland for a 31 yard touchdown pass with 1:29 on the clock.

Mollica had made the game's first score in the first quarter, on a 10 yard keeper. The kick was good. Mines responded in the second quarter with a 12 yard pass from Gill to tight end Tom Netzel and a kick by Lew Mologne. In the third stanza, Jeff Stevens scooted in for a five-yard scoring run. Mologne topped it off with another good kick. Early in the fourth quarter, Mologne nailed a kick between the cross bars on a 25 yard kick for Mines' final three points and a 17-7 lead.

With a 27-19 loss to the University of Southern Colorado, the Orediggers of Colorado School of Mines are going "back to fundamentals," says Coach Kay.

They have to. In a series of three games this season, the Orediggers have lost five of their most experienced running backs—the latest being Scott Brown with a shoulder separation. The other banged-up backs include Robin McIntosh, Alan Gray, Brian Savage and Mitch Knapton. With a week off from competition, Brown and Knapton may be back by October 11, when Mines hosts the Mesa College Mavericks.

"Actually, the game was a lot closer than the statistics reveal," noted Kay. "We were first and goal with two minutes left in the game. A touchdown and a two point conversion would have tied it all up." Sadly, the Orediggers lost the ball at the eight yard line.

Injuries have plagued the Orediggers throughout the season. Each game has meant more injuries—usually to the more experienced players. As a result, more and more responsibility is being pushed on younger and more inexperienced shoulders, with mixed results.

Against the USC Indians, the young Orediggers were able to shut off the passing game of USC's starting quarterback, but fell apart when backup quarterback Joe Pannunzio zapped them for 189 yards and two TDs.

"Hey, we still have some good things going for us," said Kay. "We were beat by two of the undefeated teams in the conference, and they were both close, good games."

Soccer

The CSM soccer team was edged 3-2 by Wyoming University September 20 at Brooks Field, here in Golden. "We dominated the first half, but Wyoming had a tough goalie who got hot in the second half and made four or five phenomenal saves," said CSM Coach Bob Pearson.

CSM managed to score twice in the first half. First, it was Bob Woods on an assist from Tom Hathaway, then vice-versa. "Overall, I felt good about the game. We were aggressive all through the game—we didn't slow down, so our conditioning is beginning to pay off," said Pearson.

The Oredigger soccer team continued to have a tough time as they lost to Denver University 3-1, were shutout by the Colorado University Buffs 5-0 and fell to the Brigham Young University Cats 5-2.

"I thought we played very well against both DU and BYU. Both were tough, good games. As for the game against CU, all I can say is that we couldn't adjust to the astro-turf—the ball moved much faster, harder and higher than anything we've ever known. We didn't make a single shot in the first half, and only two shots in the second," said Oredigger Coach Bob Pearson.

"I do feel that we've been improving with each game. We'll get another shot at DU soon," said Pearson.

Volleyball

According to CSM Coach Gail Klock, Mines will have one of its strongest volleyball teams ever this fall.

"We had a lot of people come out this fall. The roster grew from nine to fourteen, and we have some very strong women here," said Klock.

The team's established leadership rests on the shoulders of Michelle Bell, an All-Conference player last year, and Sue Schulte, "two of the calmest, most consistent players I've ever seen," said Klock.

The most exciting new element for the Orediggers may be Mary Jo Wier, a senior hitter who came to Mines after two years at DePaul University. "She's a strong blocker and our most powerful hitter," said Klock.

Sophomore Sandy White is the team's smartest hitter. "She knows how to place the ball—hit the ball where the other team doesn't expect it, often in mid-air," said Klock.

On Tuesday, September 16, the Orediggers played against Colorado College and Colorado Women's College. Mines lost against both teams in two close contests. The CSM women won the first set against CC 15-13, then lost the next two, 13-15 and 11-15. CWC beat the Orediggers in two sets, 13-15, 13-15.

"I was really pleased by our performance," said CSM Coach Gail Klock. "Both CC and CWC were taller and stronger than we are, but I thought we had better movement on the court."

The Miners lost a five match series against the University of Southern Colorado on September 26. The scores were 7-15, 15-8, 12-15, 15-7 and 12-15. That same day, the Miners lost to Adams State, 10-15, 11-15, in a set "we shouldn't have lost," said Coach Klock.

The next day, when Mines hosted New Mexico Highlands and Mesa College, the Orediggers earned their first two wins of the season. Highlands went down to defeat 15-3, 15-2, 9-15 and 15-13 while Mesa fell 15-2, 11-15 and 15-3. "The Mesa game was our most consistent performance this season," said Klock.

Cross-Country

Western State won the School of Mines Cross-Country Invitational, September 20 in Golden with a score of 24 team points, followed by Mines with 43, Air Force Academy jayvee 61, Metro State 122 and Colorado College 130.

The winning time was posted by Val Murray of Western State with a time of 23:39.9 over the five-mile course. Dennis Leck of Western State was second at 24:49, while Phil Heidt of Mines was third at 24:53.4.

Medal Nominees

Each year the Board of Trustees of the Colorado School of Mines selects a limited number of alumni for recognition based on the contributions made by these persons to the field of mineral engineering. These Medalist awards, made at Commencement, are significant acknowledgements made by the School of accomplishments of individual alumni.

Three categories of awards are given: the Distinguished Achievement Medals, van Diest medal and the Brown medal.

In a memorandum written in 1976, Dr. Guy T. McBride, Jr., made the following statement, "The Board is constantly aware that the quality and validity of the awards is critically dependent upon nominations received in this office, and desirous of having the widest participation in submitting them." To this end, the following histories and descriptions of the medals are listed. It is to be hoped that a wide participation will indeed arise from this reminder that alumni are urged to become involved with the nomination process.

Distinguished Achievement Medal

Established in 1942, this medal is awarded to alumni of any year who have distinguished themselves in the field of minerals engineering.

van Diest Medal

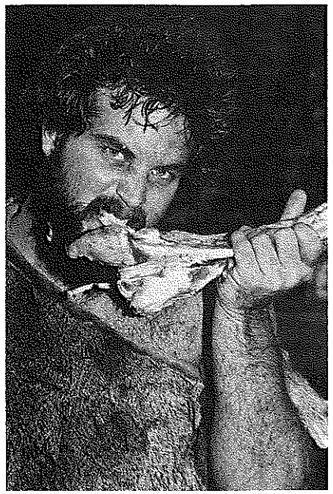
Established in 1949 by Dr. Edmond C. van Diest, E.M. 1886. This medal is to be awarded to an alumnus in the fifth to fifteenth year after graduation for "outstanding contribution." As defined by the faculty committee which established the criteria, "The contribution may be an original and significant addition to science or engineering knowledge related to the field of mineral engineering. It may be an original idea regarding design, technique, process, or interpretation of data which leads to a definite advance in discovery, recovery, refining or utilization of our natural mineral resources.

George R. Brown Medal

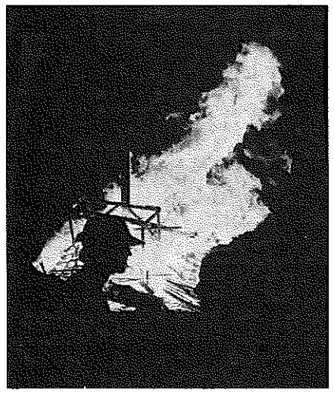
Established in 1974 by the Class of 1922 to honor class member George R. Brown. This medal is to be awarded to a person who has rendered distinguished service in or to the field of engineering education, preferably but not limited to persons who are alumni, faculty, or otherwise closely connected to Mines.

With the parameters of these awards thus delineated, give some consideration to those of your Mines associates whom you are convinced are worthy of this recognition and submit a name, together with biographical sketch and reasons for nomination, to Dr. McBride's office. A permanent file is kept for such nominations, and, in the event the nomination is not received by December 1, the deadline for this year's considerations, your nomination will be placed in this file for next year's award possibilities.

Back To The Scene Of The Crime



Don't worry Mom, he's eating right.



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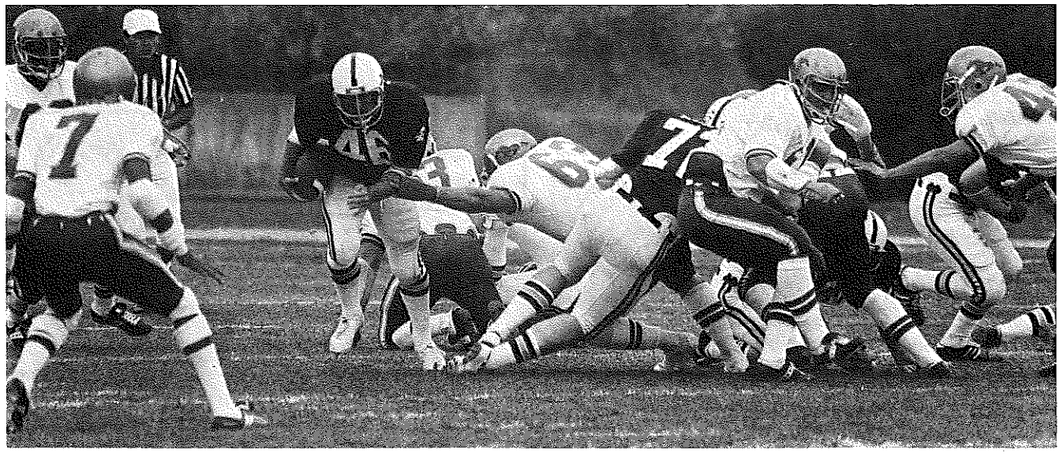


Last year, we stomped Western New Mexico 38-28. Let's do it again! *Photos: Arthur Lee*

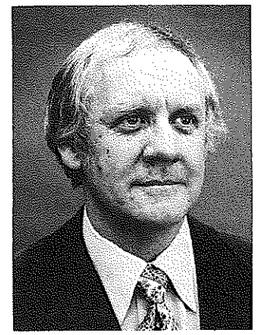
Mining Symposium

Deng Xiaoping, Vice Chairman of the Central Committee of the Chinese Communist party, and Fang Yi, Vice Premier of the State Council, welcomed delegates attending a mining symposium organized by Miller Freeman, Publications, Inc. of San Francisco.

Miller Freeman representatives at the banquet included George O. Argall, Jr., E.M. '35, Symposium Chairman, and George H. Roman, Managing Director of the China Business Division. Chinese officials present included Zhou Peiyuan, Chairman of the China Association for Science and Technology; Yan Jici, Vice President of the Chinese Academy of Sciences; Gao Yangwen, Minister of the Coal Industry; and Tang Ke, Minister of the Metallurgical Industry.

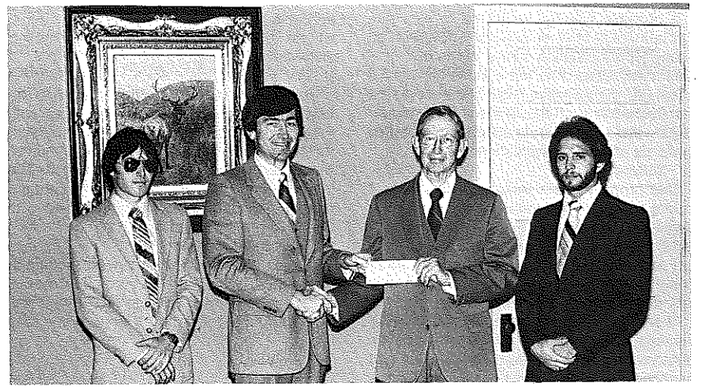
The symposium, on mine planning and development, was co-sponsored by *World Mining* and *World Coal,* the China Coal Society and the Chinese Society of Metals. It was held September 18-27 in Beijing and Beidaihe, a seaside resort in northern China.

Four hundred ninety delegates and guests from 34 countries attended the symposium.



Dr. Harry Kent, Director of the Potential Gas Agency, has been commended by the International Institute for Applied Systems Analysis (IIASA) for his efforts in the Joint IIASA-CSM Conference on Conventional and Unconventional World Natural Gas Resources, June 30-July 4, in Laxenburg, Austria. Michel Grenon of IIASA cited Kent for "valuable help in gathering a very wide collection of speakers and papers and for his continuous attendance and support" during the conference.

Kaiser Endowment



***KAISER ENDOWMENT**—The Kaiser Aluminum & Chemical Corporation has long had an interest in providing scholarships and fellowships to deserving minority students at the Colorado School of Mines. Above, the $35,000 installment on a $105,000 endowment fund is handed to CSM President Guy T. McBride, Jr. (second from right) by Steven Harvey (CSM graduate, Metallurgy 1963), staff metallurgist for the Kaiser Aluminum & Chemical Corp. of Spokane, Washington. Monies from the endowment fund will be used for merit scholarships. Current recipients of $2,000 Kaiser scholarships are Marty L. Martinez (left) of La Jara, Colorado and Phillip LaGreca (right) of Denver.*

ROTC Cadre Alumni

The Department of Military Science has a new cadre of instructors for the 1980-81 school year.

Jerry P. Ilgenfritz, Lieutenant Colonel, is the new Professor of Military Science. A graduate of Mines in 1961 in Mining Engineering, he earned his MS in Industrial Engineering from Arizona State University in 1966. His most recent assignment was Inspector General at the White Sands Missile Range in White Sands, New Mexico.

Bruce P. Goetz, Major, is an Assistant Professor of Military Science. He earned his BS in Economics from Norwich University in 1968 and a MBA in Operations Research from the Florida Institute of Technology in 1980. His most recent assignment was the 39th Engineer Battalion at Fort Devens, MA.

Charles W. Foster, Captain, is also an Assistant Professor of Military Science. He earned his BS and MS in Civil Engineering from the University of Missouri, Rolla, in 1969 and 1970. His most recent assignment was Procurement Officer, US Army Engineer District, Far East, Seoul, South Korea.

Richard D. Dilley, Captain, is an Instructor of Military Science. A 1974 graduate of Mines' BS Mining Engineering program, Dilley comes back to Golden, direct from his post of D Company commander, 92nd Engineer Battalion, Fort Gordon, GA.

letters

Dear Ms. Petty,

Recently, a lot has been said and written about the Trustee's Keystone Conference, held last July 10-13. This conference is an annual event where the Trustees, Administration, and guests reflect upon a theme pertinent to the School of Mines. A great deal of planning, thought, and study takes place at Keystone, and many ideas are formulated that bear fruit later in the year.

This past conference was a very unique gathering. In addition to those normally in attendance, sixteen students and three alumni were on hand to discuss the year's theme: Student Life.

Much thought and care went into selecting the students who served on the Keystone Committee. An extremely diverse cross-section of the student body was represented, and great pains were taken to assure that a broad spectrum of student opinion was heard. The students on the Committee actively solicited comments and responses from their peers regarding what should be addressed at Keystone. In the final analysis, a remarkable success in representing student viewpoints was achieved.

The main purpose of the Conference was to paint an accurate picture of student life. First the students simply tried to give the Trustees a feel for what it is like to attend Mines in 1980. As a follow-up, some areas of student life were discussed in detail. The positive aspects of Mines were addressed, as well as some of the pertinent problems.

The end results of the three day conference were overwhelmingly positive. A candid, honest atmosphere, coupled with thoughtful discussion, allowed everyone to gain a better insight to the needs of Mines' students, and how to best address those needs.

The format of the conference was such that relatively little time was devoted to actual presentations. Rather, the majority was dedicated to discussions in groups of varying sizes. It was in these sessions that most of the issues were broached, and most of the work occurred. Among the topics discussed were:

1. *Pressures*

Pressures certainly exist at School of Mines and, up to a point, they are decidedly beneficial. These pressures cause students to work harder, learn more, and generally become better engineers.

Problems result when pressures are compounded, supplemented by additional stress, or simply mishandled. In general, there was considerable agreement that the pressures themselves do not need to be reduced, as much as a "relief valve" is needed.

For example, the problem of the student who has a test the night before a homework assignment is due is useful. Instead of putting the student into a situation where the only way the assignment can be turned in is to spike it, a more forgiving policy toward homework was proposed. Suggestions ranged from allowing homework to occasionally be turned in late; to dropping a certain number of homework grades, thus allowing the student to miss a few; to no credit on homework, but no final grade without all homework turned in.

It is apparent that many simple alternatives exist to reduce needless pressure, while still maintaining an incentive to do homework and practice problem-solving.

2. *Course Evaluation*

Students often feel frustration in that teacher evaluations are not effective in rewarding good professors and pointing out poor ones. A large part of the problem lies in the current numerical system of evaluating professors. It was noted that for any given professor, the numbers tend to average out to scores in the middle range. Little difference is seen between the scores of good and poor instructors.

A possible solution would be to eliminate the numerical form or supplement it with an essay type evaluation similar to the one now selectively used. It is felt a more thoughtful, accurate, constructive evaluation would be manifested through this system. Several students are currently exploring alternative methods of teacher evaluations.

3. *Spiking*

This problem often results from a lack of communication between faculty and students, in that students, are unaware of which assignments they are allowed to collaborate on, and which they are not. And, as mentioned above, spiking is sometimes the only way to get an assignment turned in.

There are students who habitually spike homework. However, it is the student's responsibility to learn the material. Little can be done to prevent spiking as it involves a personal choice made by the student.

4. *Advising*

The quality of the faculty advising ranges from professors who have an active interest in the student to those who feel their responsibility lies solely in signing preregistration forms. Some uniformity is needed in the faculty advising, and more direction given to the professors as to where their responsibility lies.

Often the problem is not in the reluctance on the part of the faculty to help, but instead a lack of information on what needs to be done. A possible solution would be allowing students access to computer programs that would help in class scheduling or possibly enlisting the help of upperclassmen who know the requirements for each course.

It is realized that faculty advisors are not counselors, but rather are there to help students plan their course schedules.

5. *Counseling*

Strong support was given to the creation of a counseling office at CSM, as well as the development of peer counseling groups. Students have a clear need for an outlet when stresses become unmanagable. This office is a large step to fulfilling that need.

6. *Financial Aid*

With the increase in tuition, a great deal of discussion centered around availability of financial aid. A unanimous consensus existed that no student should be denied an education at the School of Mines because he doesn't have the money for tuition. A new financing proposal is under way to bring more private funds to Mines and make them available to students.

7. *Housing*

Housing requirements of students are being reviewed in the face of deficiencies in reasonable off-campus housing and a probable increase in the number of students whose homes are not within commuting distance.

8. *International Students*

Problems of International students attending Mines were addressed, along with the understanding that International students have a lot to offer the Mines community. Mines graduates often work overseas. The International students can help to prepare them by relating their own experiences in living in a foreign country.

9. *Alumni Interaction*

It is felt that the CSM Alumni are a tremendous, but untapped, resource. Increased contact with alumni who can share their real world experiences with students, needs to be encouraged.

The alumni who attended Keystone are outstanding examples of the benefits that can be derived from contact with the graduates. Their perspectives on the school, in light of their work experience, were very unique and valuable additions to the conference.

Many other subjects were discussed over the course of the conference, including professional integrity and the role of humanities in the engineering education.

All participants at Keystone left the conference with a great deal of satisfaction and sense of real accomplishment. All felt they had helped Mines make significant progress.

What remains to be done is a follow-up on the ideas planted at the conference. Many benefits can be achieved, and the school greatly improved, by decisive actions of the students, faculty, and administration.

Paul Giusti
Student Body

book review

"Secure the Shadow"

"Secure the Shadow" captures the life and times of Lachlan McLean, a Colorado mining photographer who worked the mining camps and towns of Central City, Georgetown and Idaho Springs.

Published by Colorado School of Mines Press, the classic photos of mines, mining camps and mining people were rescued from the dusty basement of Norlin Library at Colorado University. The discovery of 1,556 glass negatives, and the recognition of their value, launched a torturous hunt for the story behind the photographs.

McLean took standard above ground photographs for the era of 1870-1920. What distinguishes him from his contemporaries is the fact that he went underground. Faced with massive and complex problems of logistics and chemistry, McLean's technique and skill were unsurpassed.

He managed to capture the work, sweat, dirt, loneliness and even some of the danger of mining. Cast against the background of his above ground shots of mines, mining camps and people, McLean's photos preserved a history that is now only dimly remembered in the surviving mining communities.

"Secure the Shadow" complements the assembled photographs with tightly written essays on the Clear Creek Valley, the self-effacing McLean and the actual industry of gold and silver mining. The essays were written by Duane A. Smith, a professor of history at Fort Lewis College in Durango, and Hank Wieler, a journalism graduate of Colorado University. Smith has written extensively about the mining history of Colorado and the Rockies, while Wieler was the first person to realize the significance of the McLean collection.

For those who love Colorado, like mining, enjoy visiting the past or simply wish to savor the work of a master photographer, this book has much to offer. Thanks to McLean and the work of Smith and Wieler, this book has managed to "secure the shadow, ere the substance perish" of a time and people now gone. Neither will pass this way again.

SECURE THE SHADOW, Lachlan McLean, Colorado Mining Photographer. Duane A. Smith and Hank Wieler. Colorado School of Mines. All rights reserved.
Guy T. McBride, Jr., President
Colorado School of Mines, Golden, Colorado 80401
Printed in the United States of America
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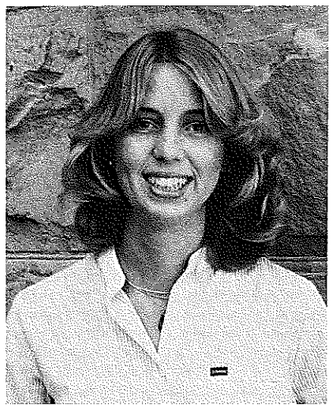
Schlumberger Award



Matilda Wilson

Matilda Wilson, a petroleum engineering student, has won the Schlumberger Collegiate Award from the Schlumberger Foundation of Houston, Texas. The merit award is for no less than $2,250 with another $2,250 to be spent by the petroleum engineering department.

Wilson, who plans to graduate in May 1981, holds a 3.90 grade point average—number one of her class in that department. "I haven't made up my mind whether I'll pursue a production or reservoir specialty," said Wilson. She added that she hopes to do graduate research work sometime in either petroleum or basic engineering.

Wilson, daughter of Connie and Robbie Wilson, 9593 E. Orchard Drive, Englewood, attended Arapahoe High School in Littleton. Her father is a petroleum engineer.

Wilson is president of Tau Beta Pi, an engineering honor society here at CSM. She plays forward on the women's soccer team and has worked as a resident assistant in the residence halls. An enthusiastic nordic skier, she hopes to make the school's skiing team this winter. Wilson has been on the Dean's List throughout her college career, and is listed in Who's Who in American Universities. She worked this summer on an off-shore drilling rig in the Gulf of Mexico.

—mm—

eMbers

The hills of Colorado and other Western states have taken on new life recently, as gold and silver prices rise and visions of wealth entice many serious and full-time miners back to the glory holes and stream beds which may show a little "color." The tyro "week-end warriors" also find the adventure tempting. They buy books; invest in gold pans and equipment; and hang around bars and general stores in the mining camps, hoping to learn the secrets of the old-timers.

One of the secrets the old-timers might share is the fact that the easily found mineral was pretty well exploited by the early miners. That there is still good ore available is true; that it is easy to find, just there for the easy pickin's, is a misapprehension.

The image of the solitary miner, lonely, hard-working, determined and eventually successful, dies hard. Except for movies and novels, however, the image has long since faded from the mining scene.

Today, the development of precious minerals will almost all take place under the auspices of large, well-funded companies. The facts of mining in the United States today: complicated leasing or purchasing regulations, tightly controlled development procedures, strict health and safety measures, all require capital far beyond the resources of most individuals. Only a company or group of investors with large financial reserves or the ability to put together enormous amounts of capital will successfully enter new mine exploitation.

The mandates of these economic trends will continue, and may, in fact, be stepped up. Any prospect of an increase in the cost of new resource development is frightening—already existing mines are closing because of financially unbearable regulations promulgated and applied to an essential industry. It does not take much imagination to perceive that investment in an industry such as mining, under fire from unrealistic and idealistic sources, becomes fairly unattractive.

The "old-timer", haloed about with romantic illusion, has all but vanished. In his place, we see corporations, boards of directors, echelons of management. The titles conjure up feelings of power. Is this true of the mineral industry today? In some ways, today's industry boards and directors and structures are as vulnerable as the lonely miner, struggling through unmapped terrain, was over a century ago.

At the recent American Mining Congress meeting in San Francisco, men of national prominence and professional stature reiterated warnings that: "We are falling behind, becoming a second-rate military power;" "we suffer from imbalance in imported minerals;" "regulations are killing the industry."

Inflation, taxation, the inability of the U.S. government to balance the budget or cope with social problems; lessening of productivity; increasing selfishness of special interest groups—all these things, and more, are working against the resource industries.

At Colorado School of Mines, we are developing a very special breed of engineer to deal with energy and mineral development. We are also training people with special skills to better enable them to confront the tremendous economic and environmental problems of development and production. We are but a small group, however. The whole engineering academe must agree on this same course, supported by the industry, which will ultimately benefit. Now, as never before, the minerals industry, if it is not to fade away like the legends of the solitary gold-seekers, must band together and present a united front to the government and to the public.

Gold and silver seekers in the mountains, coal producers on the plains, uranium, trona, sand and gravel operators—all must face the reality of assessing the economic and political pressures, determine the best way to combat them, and make the decision to educate and influence the public and government toward the necessity, as well as the "romance" of mining.

Patricia Curtis Petty

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