Why would any good engineer go to work in a factory?

That's sort of like asking why a banker goes to work in a bank. A guy goes to work where the best work is. And some of the best engineering work around today is in and around factories. For delivering power generation equipment to utility customers? Or developing quality control procedures for the world's most powerful airplane engine? Or managing a production team responsible for designing the numerical control system for an automated steel mill? Or what would you say to a General Electric program that puts you right to work on jobs like those?

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Gentlemen, please stand and toast
That paragon from coast to coast.
That splendid man, A-plus we rate.
The metallurgical graduate.

But do not drain your glasses yet;
More men there are, let's not forget.
Who fan the sparks to glowing embers—
God's final touch, the faculty members.
Their choices (I can hardly blame)
Must inevitably merge
And fall on those with metallurgical distinction;
To teach the students in Hill Hall.

What kind of men are these I praise.
Who spend their nights (and sometimes days)
Pondering matters educational.
Oblivious to things sensational?
What do they teach? How do they teach it?
What is their goal? When will they reach it?
Why have they forsaken riches
(Selling donuts, digging ditches)?
Let me speak of them, these sages.

Ted Balberyszski, handle unspellable,
With word-production completely unquellable,
Teaches extractive, non-ferrous for preference.
And acts as the School's metaphysical reference.

Walter L. Bradley, a demon at tennis.
Is thought of at Loveland as skiing's mam menace.
He's said to be quite good at physical met.
But needs an interpreter, so we can get
An inkling of what he is muttering there
In his Texan vernacular—but do we care?

Bill Copeland eats X-rays for breakfast and dinner.
And teaches kinetically, so he gets thinner.
He watched the Vikings while growing a beard.
But when they had lost, he had it all sheared.
His knowledge of rusting is deep and forbidding;
He calls it corrosion—but who is he kidding?

Antipodean engineers
Farewelled Ron Davey, close to tears.
He now displays amazing knowledge
Teaching smelting at this college.
He also makes a point to warn ya
About the wines from California.

Woe unto us! Hildreth Frost
Is leaving us, and much is lost.
Is it too late to make him stay?
That greener pastures at the Mint
Have lured him from our cherished plot?
He will be missed. His pipe will not.

Paul Harrop, Golden's leading potter,
Has several minor faults, but not a
Single one can I remember.
(My salary for next September
Will soon come up in conversation
Between him and the administration).

As founderman and such, Don Kliet
Would get my well-considered vote.
A well-freeze investigator,
He enlightens as administrator
Of research at CSM.
He has the funds, but clings to them.

Jack Lubahn strains great lamps of steel
Until they break, and students feel
There must be better ways to spend
Their time and money than to bend
These artifacts; and so he speaks
Of Socrates and other Greeks.

Phenomena of transportation
Don't seem to have the fascination
To be a fellow's predilection;
But Gerry Martin's the exception.

Al Schlechten used to run the show
But had a call to up and go.
To spend his talents and his time
Languishing in Guggenheim.
On academics' affairs he spies
With tolerant, paternal eyes.

So there they are, these perfect men;
We may not see their like again.
Some come from far, you can tell by their manner.
Australia, Guyana, even Montana.
They form an alloy of super-resilience.
Toughness and luster, nay, dazzling brilliance.
With men like these, who could be fearing
The future of Met. Engineering.

—W.R.B.
IT COULD BE VERSE

Gentlemen, please stand and toast
That paragon from coast to coast.
That splendid man, A-plus we rate,
The metallurgical graduate.

But do not drain your glasses yet;
More men there are, let’s not forget,
Who fan the sparks to glowing embers—
God’s final touch, the faculty members.

And of the best in academia
Your choices (I can hardly blame)
Must inevitably merge
And fall on those with metallurgical distinction, and a call
To teach the students in Hill Hall.

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Pondering matters educational,
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What is their goal? When will they reach?
Why have they forsaken riches
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Let me speak of them, these sages,
Before you turn to other pages.

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INFORMAL DISCUSSIONS AND SEMINARS are an integral part of the activities of the Hydrometallurgy Research Group.

ADDED EMPHASIS ON HYDROMETALLURGY RESEARCH

Recognizing the ever increasing importance of hydrometallurgical processes for the recovery of metals, the CSM Department of Metallurgy places special emphasis on the development of educational and research facilities in this area.

A Hydrometallurgy Research Group, headed by Prof. T. Balberyszki, is now in its second year of existence and has attracted a large number of students from universities throughout the U.S. and overseas.

The Hydrometallurgy Research Group is engaged in three major areas of research:

1. Investigations of kinetics of liquid-solid reactions in aqueous systems, with particular reference to solubility and metal precipitation studies.
2. Investigations of electrodeposition of metals from aqueous and fused salt electrolytes.

In addition to the above areas of research, plans are underway for the establishment of a High Pressure Laboratory devoted mainly to fundamental studies of the behavior of solids in aqueous solutions at very high pressures. Specialized equipment is being built for that purpose and it is hoped that this will become a major effort in the field of High Pressure Hydrometallurgy.

The varied backgrounds and the international character of the Hydrometallurgy Research Group contribute greatly to the educational process. Many hours are spent by its members on informal discussions and seminars, during which an opportunity is provided to exchange views on topics of professional and general interest. Recognizing the importance of initiative and independent work, programs of study are arranged so as to allow maximum time for library research and experimental work. A feeling of team work is encouraged to insure breadth as well as depth of knowledge in the general field of hydrometallurgy.

Currently, the following research projects are conducted:

1. Kinetics of co-deposition of Ni ++ and Cu ++ ions from a CuSO 4-H 2 SO 4 electrolyte—John Gathje (USA).
2. Optimization of process parameters for a continuous copper cementation system—Libardo Ibagos (Columbia).
4. Electrorefining of titanium from fused salt electrolytes in ultrasonic fields with superimposed AC current—Marco Gisnatta (Italy).
5. Kinetics of dissolution of CuO in phosphoric acid—Turgut Ergun (Turkey).
8. General program in High Pressure research being developed by Prof. T. Balberyszki.

Additional members of the Group are Mr. Sareyed-Dim (Brazil) and Mr. R. Eaman (USA).

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The People of Research

For many, the word research brings to mind a sterile glass and stainless steel building which holds together countless cubicles containing faceless technicians gathering endless data for investigators who are catching planes for somewhere else. Current research in the field of classification is required of all students who receive an advanced degree but the emphasis is on the educational aspect of the research rather than on its prestige value. Real people are involved in a wide variety of interests that extend beyond the laboratory. The technical and social interaction of these people is important part of the educational process. We are developing a group of people who are interested in research. The social functions certainly have an international flavor and soccer is the predominately athletic endeavor at graduate-staff picnics.

A brief outline of the various research groups will give an indication of the type of projects currently being pursued and the people who are carrying them out. The mineral processing group is headed by Dr. Harry A. Davey, an Englishman by way of Australia and the department's leading advocate of cricket, rugby, and squash. Two Australian students have come half way around the world to work in this group. D. B. Elder (Figure 1) is working in the field of classification, and V. D. A. Davey is studying the chemisorption of gases onto zinc oxide and has published a number of significant thermodynamic papers in the past two years. Ramsey Henshaw is engaged in research on "The Thermodynamic Properties of Liquid Metal Solutions" and has brought with him expertise in a number of fields from mass transfer to theoretical metalurgy and has been featured elsewhere in this issue. It is the most advanced facility of its kind, and if you're with Western Electric you could be working there next year.

FIGURE 1—John Oxenford adopts a pose, learned during his career with the local amateur theatrical society, while carrying out a size analysis with the Cyclosizer.

The hydrometallurgy group is headed by Professor B. H. B. Barlow, and has been featured elsewhere in this issue. It is an experience to sit in on their weekly seminar where the subject may range from the effects of pressure on the dissolution of metals to the philosophy of education.

Dr. G. B. Martin has recently arrived in the department and has brought with him expertise in a number of fields from semi-conductor related to the vacuum deposition of metals to the repair of refrigerators and washing machines. The latter skills have put Dr. Martin in great demand with the less handy faculty members.

Dr. Jack Lubahn heads the mechanical metallurgy group and reports that he has gathered contracts with the Army Materials Research Center and with the Dow Chemical Company. His full time students include Daryl (Figure 2—Adolpho Zambrano working in the mass spectograph laboratory.)

Probably the most sophisticated research group is the one headed by Dr. John Hager. He has established one of the nation's outstanding mass spectographic laboratories and has published a number of significant thermodynamic papers in the past two years. Ramsey Henshaw is engaged in research on "The Thermodynamic Properties of Liquid Metal Solutions" while Adolpho Zambrano is studying the chemisorption of gases onto zinc oxide (Figure 2). V. Anamall has recently joined this group and may soon be engaged in a project concerning the thermodynamics of vapor complex formation.

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FIGURE 2—Adolpho Zambrano working in the mass spectograph laboratory.

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Lemon, Orville Lee, Nurenda Faveri, and Conrad Filtal who find that a stop at their advisor's door can lead to a lengthy philosophical discussion.

Dr. Walter Bradley received an NSF Initiation Grant for work on creep-fatigue processes. Max Glenn is heading that project for him and the apparatus that they have designed (Figure 3) may be responsible for seismographic anomalies in the geophysics department. Tom Glenn claims the longest piece of equipment which he uses on a high strain rate deformation project while Shusil Bhambri is completing his work on severe plasticity in high strain rate deformation.

Another physical metallurgy group is directed by Dr. Bill Copeland. Jose D'Amico is completing a study of the effect of microstructure on high temperature oxidation. Kjell Lovold has completed a project on the effect of hydrostatic pressure on fatigue and will begin using the sophisticated apparatus which he designed and had built to study effects of pressure on corrosion fatigue (Figure 4). Richard Weltzin is an IBM Fellow who has designed a group of experiments relating the state of stress to the corrosion rate in steel plates (Figure 5). Professor Betty Beek of the University of Oregon is an NSF Faculty Fellow and plans to work on a systems approach to oceanographic materials selection. Soo Woo Nam is investigating the effect of microstructure on high-temperature oxidation.

The chairman of the Metallurgy Department, Dr. Paul G. Herold, would not be expected to have much time for research in his field of Ceramic Engineering. Not only are the duties of leader of a major department pressing, but Dr. Herold also has many social and civic responsibilities. Yet he is presently developing a major project concerned with waste disposal which will supplement his other research activities.

Those are the people presently engaged in research in the Department of Metallurgical Engineering at the Colorado School of Mines. Whether they are working together or playing together, they are participating in an important educational experience.
Metallurgy Faculty

D. PAUL G. HERALD is head of the Metallurgical Engineering Department. A native of Mansfield, Ohio, Dr. Herald received his B.S.E, M.S., and Ph.D. degrees from Ohio State University. He had extensive experience as a ceramics engineer before joining the staff of the Colorado School of Mines in 1963 and served as a research professor of Ceramic Materials until he was elevated to the head of the Department of Metallurgy in 1969. He is a member of the American Society for Testing Materials and the American Ceramic Society.

R. W. REX BULL, associate professor of Metallurgy, is a native of England. Dr. Bull received his B.S. degree in Mining Engineering from Leeds University and his Ph.D. degree from the University of Queensland, Australia. Dr. Bull served as a scientific officer for the Government of Canada for four years and later as a lecturer at the University of Queensland in Brisbane before joining the faculty of the Colorado School of Mines. He is a member of the Australian Institute of Mining and Metallurgy and the author of numerous scientific and professional papers.

WILLIAM D. COPELAND, associate professor of Metallurgy, is a native of Colorado Springs. He received his B.A. degree from Carleton College and is a candidate for the Ph.D. degree from the University of Minnesota, where he has served as an instructor, research assistant, and research fellow before joining the faculty of the Colorado School of Mines. He is a member of AIME and of the American Society for Metals.

D. R. WALTER L. BRADLEY, assistant professor of Metallurgy, is a native of Corpus Christi, Tex. He received his B.S. degree in Engineering Science and the Ph.D. degree in Metallurgy from the University of Texas. Dr. Bradley worked with industry as a project engineer and also taught at the University of Texas before coming to the Colorado School of Mines in 1968 as assistant professor of Metallurgy.

R. DONALD T. KLODT is a research coordinator and associate professor of Metallurgy. A native of Denver, Dr. Klotd received the professional degree of Metallurgical Engineer from the Colorado School of Mines. He earned M.A. and Ph.D. degrees in Metallurgy from the University of Denver. Dr. Klotd is a member of the National Association of Corrosion Engineers, the American Society for Metals, and AIME. The author of a number of scientific papers, Dr. Klotd is currently chairman of the Graduate Studies Committee of the Colorado School of Mines.

D. JOHN P. HAGER is assistant professor of Metallurgy. A native of Miami City, Mont., Dr. Hager received his B.S. degree from Montana School of Mines, his M.S. from Missouri School of Mines, and his Doctor of Science degree from Massachusetts Institute of Technology. Dr. Hager was employed as a research engineer with several industrial firms before coming to the Colorado School of Mines. He is also the author of a number of scientific papers.

D. R. JACK D. LUBASIN, professor of Metallurgy, is a native of Cleveland, Ohio. Dr. Lubahn received his B.S., M.S., and Ph.D. degrees in Metallurgy from Case Institute of Technology. He was a research and consulting engineer with General Electric Co. before joining the faculty of the Colorado School of Mines in 1961. Dr. Lubahn holds a patent on an invention for making stress-strain tests and another on tensile testing apparatus. He is a member of the American Society for Testing Materials and of the American Society of Mechanical Engineers.

FEBRUARY. 1970—THE MINES MAGAZINE

Dr. Lubahn received the professional degree of Metallurgical Engineer from the Colorado School of Mines. He earned M.A. and Ph.D. degrees in Metallurgy from the University of Denver. Dr. Lubahn is a member of the National Association of Corrosion Engineers, the American Society for Metals, and AIME. The author of a number of scientific papers, Dr. Lubahn is currently chairman of the Graduate Studies Committee of the Colorado School of Mines.

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SPECIALISTS IN THE IN SITU MEASUREMENTS OF SOIL AND ROCK BEHAVIOR

Donald R. Stewart '61 — W. H. Thornley, Jr.

February, 1970—The Mines Magazine

"Hidy" Frost to Leave Mines

AFTER 15 years on the faculty of the Department of Metallurgical Engineering, Professor Eldrid Frost, Jr., has resigned to take up an appointment as chief assayer to the Denver assay office. He has been on the Mines faculty since 1955, and his resignation has been accepted by the U. S. Senate, and he assumed his duties on Feb. 1, 1970.

Professor Frost graduated from Mines in 1939, and worked as an engineer at the Golden Circle mine at Cripple Creek until 1941, when he joined Wilson and Co., Engineers, in Pueblo. Shortly afterward, however, he joined the U. S. Army Corps of Engineers and was engaged in a wide range of duties until 1944. He then joined Denver Equipment Co., where he was sales engineer and subsequently chief engineer in charge of development and drafting on mining and milling equipment and process plants.

In 1951 he became a consultant, and worked in many parts of the U. S., Mexico and South America. From 1963 to 1964 his time was divided between a CSM Fellowship and his consulting, but in 1964 he joined the faculty as an instructor, being promoted to assistant professor in 1965. In 1967 he was also appointed administrative assistant to the head of the Department of Metallurgical Engineering, and was largely responsible for the planning and design of Hill Hall. His teaching duties included Mineral Dressing, Ore Microscopy, Metallurgical Plant Design, and Foundry Metallurgy.

Hidy had a heavy teaching load, but was always available to the students for counselling or just plain conversation. He was always ready for a cup of coffee with other faculty members and was prepared to give a story or movie on any topic. He devoted a great deal of his spare time to the Boy Scout movement, and last year he was voted the skier 'least likely to fall' by an ill-defined group. The 'men he has left behind' would like to express their appreciation to Hidy for his long service and unstinting devotion to the well-being of the Department of Metallurgical Engineering and its students.
NEW GUINEA — ISLAND OF HIDDEN WEALTH

Bougainville — A New Venture In Mining and Metallurgy

By Prof. T. Balberyszski

Professor Balberyszski, who visited the Territory of Papua New Guinea during the summer of 1969, was particularly impressed by the impact of the Bougainville project on the economy and the changing way of life on the island.

WHAT? until recent years was one of the least known and most inaccessible parts of the world may soon become a major source of mineral wealth and a focus of mining and metallurgical endeavor. The Territory of Papua New Guinea, comprising the eastern half of the third largest island in the world, is still a sleeping giant ready to be awakened.

In 1953, the Conzinc Rio Tinto of Australia Ltd. and New Broken Hill Consolidated Ltd., two of the largest mining companies, sent exploration teams to Bougainville and discovered huge reserves of copper. By 1965 diamond drilling established proven reserves of 66 million tons of 6.8% ore. At this point a mining agreement was reached with the Territorial Administration and preliminary feasibility studies were undertaken.

In 1969 the proven reserves were found to be 20 times larger than initially estimated, and the project was announced as one of the most exciting in the world. By 1975 the Bougainville Copper Project will be fully operational, with production reaching 100,000 tons of copper, 400,000 tons of copper concentrate, and 520,000 ounces of gold per year.

The income to the Territory from such an operation would exceed $50 million a year, and the amount of exports would more than double. The project will also mean the training and employment of thousands of people, building of new townships, schools and hospitals. New port facilities will be provided, and a network of roads established.

And yet, in spite of these obvious advantages, much resentment is shown by the indigenous population. It stems from the disruption of their ancient way of life—a life of simplicity and tranquility. The indigenous population will have to overcome to bring the project to completion. Whether this ever happens will depend on the foresight and wisdom of the Administration and the CRA management.

World War II resulted in the establishment of an administrative framework that would endure until 1969 when the Administration of what is today known as the Territory of Papua New Guinea was established. The discovery of gold and of many fertile lands along the coast encouraged the Australian administration to convert the native population to the white man’s way of life. The savage battles waged by the belligerents in World War II resulted in the establishment of an administrative framework that would endure until 1969 when the Administration of what is today known as the Territory of Papua New Guinea was established.

The Bougainville Copper Project is the result of the Administration’s efforts to determine and develop the natural wealth hidden in the depth of the jungles and below the massive mountain tops. Situated in the Pangan Valley of the Bougainville island, the copper deposit (estimated at some 300 million tons of 6.8% copper and 0.4 oz. gold) will be developed in what will most likely be the largest open pit mine in the world. Although mineralization was observed in that area as far back as 1934, it was not until 1950 that geologists sent by the Australian government took a serious look at it.

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Low Cost Group Flight to Europe

If you would like to attend 1970’s big events in international mining — VI International Mining Congress in Madrid, IX International Mineral Exploration Congress in San Francisco, and VII International Mineral Exploration Congress in New York — you will be interested in the low-cost group flight outlined above. These conferences are the world’s leading events in the mining industry, and the group flight may be sent to you.

Please return to: George O. Argall, Jr., Editor, WORLD MINING, 500 California Street, San Francisco, California, 94105

NAME

FEBRUARY, 1970 — THE MINES MAGAZINE
Outlook for 1970

By Frederick A. Fielder

Looking at the business climate for 1970, my opinion is that it should remain at a high level but will not have the pace experienced in 1969. However, even though the level should be at or near last year's mark, I see a continuing squeeze on earnings. Net income will be adversely affected by steady increases in operating costs, a continuing tax load and the persistent erosion of real income due to inflationary pressures.

Some of the added operating costs tending to narrow the earnings potential are already with us. Railroad freight costs were increased six per cent Nov. 18, 1969. Some estimates peg the cost to the economy to be as high as $600 million per year. Added to this should be the increased freight charges by the trucking industry, ranging in various amounts up to six per cent.

Another important cost is interest. Industry is still plagued with trying to add muscle to its productive capacity through much needed modernization and the introduction of new technology while facing on the other hand with the high cost of the money that would be needed to do the job. As an unknown factor in the year ahead is the eventual effect on industry planning of Congress's attempts to tighten up our tax structure.

Despite the adverse factors touched upon, industry's expenditures for plant and equipment should again increase in 1970, but not as rapidly as in previous years. The industry consensus as to the total seems to be between 70 and 75 billion dollars. This comes on the heels of the 71 billion estimated for 1969 and the 64 billion expended in 1968.

The other side of the coin on increased railroad freight costs is that railroad earnings should improve somewhat and may be reflected in a reasonably active year ahead for the freight car builder.

Authoritative railroad sources state that servicable cars as of Sept. 1, 1969, numbered 1,362,600 with the figure at 1,300,000 for the same date in 1968. Up to Oct. 1, 1969, about 50,000 new freight cars had been delivered, compared with about 63,000 in the like period for 1968. Housing starts during the coming year are not expected to be too spectacular, according to government figures. Projections indicate that the figure will hover around the 1,300,000 mark. This approximates that of 1968 and 1969, but is still substantially ahead of the 1,200,000 posted in 1967.

The seeming weakness in housing starts should be qualified by the almost phenomenal growth in mobile homes. This growth, I feel, has eclipsed off a good percentage of the money that could have otherwise been put into conventional homes.

The steel industry expects to contribute its share to the economic picture. Statistics from the American Iron and Steel Institute show that capital spending by the steel industry has been running over $2 billion for the past two years and should be about the same amount in 1970. I expect much of this spending will continue to be concentrated on modern equipment that will be faster and more productive. Phasing out of obsolete facilities and methods will be quickened as further refinements are made in basic oxygen furnaces (BOF), continuous casting, electric furnace and related production and finishing lines.

To summarize, the coming year should be a fairly good business year for industry in general with no dramatic changes upward or downward.

Fred B. Hynes, '41
Western Regional Sales Manager

FEBRUARY, 1970—THE MINES MAGAZINE
Jack P. Bonardi

His first duties involved the analysis of the products of the radium plant for chemical control. Later, he was in charge of all the radium crystallizing operations and subsequently supervised the closing down of the plant in the Fall of 1917. During his association with this plant, 100 per cent radium bromide salt (later converted to the sulfide form) was prepared for the first time in this country, and 100 mg. of the salt was delivered to the U. S. Bureau of Standards for use as a government standard.

During his association with the Bureau, he was sent on special assignments including Carlin, University to work with Dr. H. W. Gillett on research involving the use of molybdenum and cerium in steel; University of Nevada (Reno) to supervise the installation of the equipment for chemical control. Later, he worked in research in flotation and cyanidation. Although Jack was a busy man, he always nursed that he would succeed in the cause of the confidence he had always had in his previous successful career, he accepted the position because of the confidence he had always had in his ability to do what he would succeed in business. As he tells it, "After all, much depends upon the skill and ingenuity of the operator."

Bonardi

DONALD C. B. MARSH, professor of Mathematics, has the following degrees: Ph.D. (Mathematics) 1934 (University of Colorado), M.S. (Mathematics) 1948 (University of Colorado), B.S. (Mathematics) 1947 (University of Arkansas).

ARDELL J. BOES, associate professor of Mathematics, has the following degrees: Ph.D. (Mathematics) 1969 (University of Missouri-St. Louis), A.M. (Mathematics) 1961 (University of Missouri), M.A. (Mathematics) 1954 (University of Minnesota).

RAYMOND B. GUTZMAN, associate professor of Mathematics, has a M.S. degree (Mathematics) 1946 (E.U.N.Y. at New Paltz).
Walter W. Whitman, the author of this article, received his Ph.D. (Operations Research) from the University of Texas in 1969 (requirements completed), Dr. Whitman's biography appeared in the January, 1970 issue of THE MINES MAGAZINE.
Q U I T E often a salesman is asked to leave old files or to show someone else in his organization, perhaps an engineer. By all means honor his request but don't walk away with the comfortable belief that the sample will make the sale for you. It won't. You must back it up with a solid presentation. The buyer needs more than just the same volume of cases to leave them on his desk.

A seller needs more than just the same volume of cases to leave them on his desk. He buttressed the samples with an entire background memorandum explaining necessary for getting the buyer to give him an order. The young man leafed through the volume was immaculate.

"No sample should be left with a buyer unless it is complete and perfect in every detail. A misplaced tag or label, a dirty or soiled sample could spell disaster for you, for you deposit the product with the purchaser, go over it with loving care. Make sure its appearance has maximum appeal. A sloppy job on the part of a young man called at our house, selling encyclopedias. He was obviously well-dressed and educated. But what impressed me most was the way he handled his sample. He had a volume of the encyclopedias in a doped, velveteen bag inside his briefcase. The salesmen and doctors were proud of the book with new leather covers. The volume was intended to sell an encyclopedias. A sloppy sample can not only spoil the effect of your sales talk by the way he handles it, but it may cause a big order. The worst of all is that he will never buy from you."

"I felt I had him partially sold and the prospect for years to come. He may be distracted and did not absorb all your points. There may not have been a convenient location for showing him the presentation."

"There are some situations suggested to the prospect that he keep the sample for a few days and look at it later on. You can refuse to give him the sample and it could mean a big order.

One salesman, Ron Cassel, left an expensive calculator with a prospect for a few days. It was the only one he had with him. It was a week before he heard from him. He said, "Do you think it was right to leave your only machine with a cold turkey prospect?"

"I felt I had him partially sold and the machine will do the rest for us."

"I can not decide if it was right to leave the sample with him."

He explained that he didn't know much about the equipment. Therefore, he wanted to keep the sample. But it was the biggest order he had ever received.

"I lost the sale but I taught my lesson."

"The salesman had the least order his friends had ever seen."

"He picked it up as if he had never seen it before," the salesman said. "The buyer, a contractor, said, "I wonder if the equipment is as good as that which I have been using in the past."

"It was bad but the salesman lost the order because his friend had lost confidence in him."

"Their sample care—"Some samples are customarily handed out with a light touch, especially when they are large or bulky. This is an error. The sample can not only spoil the effect of your sales talk, but it can mean a big order."

"I had a salesperson who completely destroyed the effect of his sales talk by the way he handled it."

"He picked it up as if he had never seen it before," the salesman said. "The buyer, a contractor, said, "I wonder if the equipment is as good as that which I have been using in the past."

"It was bad but the salesman lost the order because his friend had lost confidence in him."

"Picking Your Setting—Where do you show your samples? Show with an extremely important factor in getting the order."

"Some buyers will be amazed if you have a sample of the item you want to show them. They will be more interested if you put it anywhere else."

"In any event, don't choose a spot where the sun shines."

"The best of all is that he will never buy from you."

"Outside Showings—A salesman may have to show his samples in a hotel suite or temporary location. In this instance, he may be hot and the host should perform accordingly. Make sure the sample is attractive to the prospect. Be sure the lighting is adequate. Make sure the lighting is adequate."

"He has all warmed up with your sales talk and then have to run out to get the sample. The prospect may be considerably cooled off by the time you get back."

"Because samples can't talk." Grady Quist, a salesman, said. "They can't furnish the prospect with the practical plan necessary for getting the buyer to give him an order."

"Talk About Your Sample. Some salesmen avoid carrying samples, especially when they are large or bulky. This is an error. The sample can not only spoil the effect of your sales talk, but it can mean a big order."

"A sloppy sample can not only spoil the effect of your sales talk, but it can mean a big order."

"There are some situations suggested to the prospect that he keep the sample for a few days and look at it later on. You can refuse to give him the sample and it could mean a big order."

"I can not decide if it was right to leave the sample with him."

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"FEBRUARY, 1970—THE MINES MAGAZINE
What you need to fly 20,000 dragging a bomb on a 500-foot exploring for nickel.

Sound involved? It is...

Exploring for nickel is complicated and expensive.

To start it fast and efficiently, you start in the air.

You dip into your pocket and come up with over $100,000 for a plane you'd feel safe in flying 30,000 miles a year at an altitude of 300 feet going 120 mph. Then into your pocket again for another $200,000. That's what it will cost you to modify your plane and install equipment you'll need to locate nickel.

The bomb is like a microphone. You let it dangle from a 300-foot cable. The sensing devices inside detect mineral deposits on the ground and relay the information up to the electronic equipment in the plane.

The sensing devices inside the bomb are as sensitive as your hearing aids. If you happen to be in an unusually tall tree, you'll be in trouble.

Of course, once you've acquired this expensive equipment, you'll want to go to where the nickel is.

One of your bets would be northern Canada. So dress warmly and bring lots of supplies.

Up there it gets down to 40° below, and you won't find much around.

You've got the equipment and you know where to go. Now you need men. Well-trained, well-experienced men. If you can find five like the ones pictured below, that would be ideal. From left to right they are: Ted Mattison, data processor; Randy Furneaut, navigator; Herb Povey, group head; Bob Wells, pilot; Paul Wester, equipment coordinator; Bob, Paul and Randy work the plane hunting for the nickel.

When they land, they turn their electronic readings over to Trevor for interpretation.

You'll see one of these men and you've got your chance of finding nickel.

Well, that's it. For one thing, you've got a nickel, your work is just beginning. You'll have to face experienced men to go in on the ground and meeting the mines. Then you'll have to send in more men to drill hundreds of holes for your evaluations.

So be patient. This takes a lot of time. If the findings turn out negative, don't be discouraged. That's how it goes.

Put it, with a combination of effort and knowledge and a mod from Lord like, you've got your fortune on the deposit of nickel. There are a few things still to know: the best way to process it and put it on the market.

Before you give that information, there are a lot of things you should check on.

Like cutting your hand on a few dozen million dollars and a few thousand workers.

Once you've got those two things worked out, you're ready to tackle the big problems.

Nickel helps other metals resist heat, cold, impact, pressure, strain, corrosion. Its advanced engineering in vital fields—power, desalination, electronics, transportation, aerospace.

We're doing everything we can to produce more nickel. Searching around the world: Indonesia, Australia, Guatemala, Canada. We've found ways to extract nickel from ores that were thought too poor to mine a few years ago.

We doubt our blessings and respect our surroundings. From nickel come new ways to recover platinum, palladium, tellurium, tantalum, commercially useful elements. Make iron pellets for steel. Convert smoke in our stacks to chemicals for other industries. One out from processing, one grows millions of pounds.

We are explorers. We live in 10 countries: Mines, researchers, market hucksters. We bring opportunity to underdeveloped lands, new technologies, new payrolls, new tax income. Nickel in the ground is useless. We put it to work.

INTERNATIONAL NICKEL

The International Nickel Company, Inc., New York, N.Y.

The International Nickel Company of Canada, Ltd., Toronto

**Annual Meeting**

Colorado School of Mines Alumni, Inc.

The annual meeting was held on the evening of Jan. 23, 1970, at the Lakewood Country Club. More than 180 Miners and their ladies attended. The buffet table with oiled the onslaught of the hungry, even as happiness and cheer reigned. After dinner the meeting was called to order by President Robert Johnson, who introduced the guests at the head table. These were: Mrs. Johnson; Hal and Mrs. Addington, our new president; Harrison and Mrs. Hayes, our new president-elect; Neal Harr, our new secretary; Dave Spilb, director; and Bob Magnie, who was re-elected as treasurer.

The officers for 1970 were introduced: President (a) Addington, Secretary Neal Harr, Treasurer Bob Magnie, and Directors David Spilb, J. D. Vincent, and Dan Craig. A brief report of the financial condition of the Alumni was presented by Mr. Johnson, who noted that the report on the condition of the Association will be published in the February issue of The MINES Magazine.

"General Operations—Tuition increased to $79,891.27 in 1969, as expenses also increased to $78,831.36. This represents a net gain of $1,059.91 for the year as the first substantial profit in the past several years. All accounts payable for 1969 have been paid and it has been a successful year, both Magazine advertising and subscriptions have shown a gain during the year. In spite of this, the advertising income decreased sharply as did the printing cost. In 1969, the Magazine became profitable for the first time since its inception. The increase in advertising revenue and subscriptions has been a gain for the Alumni and the Magazine.

"Section Activity was not confined to those mentioned below, but their contribution has been recent. The Denver Local Chapter has supported the local recruiting effort personal visits to various high schools and by participation in meetings sponsored by Mines in this effort. Early in 1969, the Alumni Council decided to sponsor the attendance of a group of Tulsa High School seniors at the annual Engineers’ Day in 1969. The Tulsa group has raised all funds to finance this trip for these seniors. Neve Matthews, Tulsa, who has been the spark plug in this effort, reported, "all we need now is the money." The program is underway for 1970.

"Course for begun at the local section—Another summer field workshop in petroleum was completed in the summer of 1969. Mining was also added this year. The course is intended to familiarize the interested high school science and engineering teachers and counselors with the facts of natural resource utilization. This program is funded and taught by personnel of the Colorado Petroleum Council and sponsored by them with the Colorado School of Mines and the Colorado Mining Association. The program is held at the Boulder School of Mines and the Colorado School of Mines. The courses were a success and those completing them received the title of "Certificate of Advanced Educational Degree." They also viewed the mineral industries more closely and became involved in the fields of natural resource utilization. An article describing the field trip was published in the December 1969 issue of The MINES Magazine.

"The Fred Fund will show a decrease in assets as of Dec. 31, 1969, this exact amount could not be deter- mined in time for this meeting. Income from investments increased from $3,568.42 in 1968 to $5,514.42, or $2,945.92. This was accomplished by shifting securities from small to large stocks, Convertible debentures.

"President of the Student Body at Mines, Mr. Dave Pavel, and President Charles Crew of the Senior Class are present with their wives and we are happy to have them here. In addition to the 23 alumni present this year, there is a record of 181 Alumni present. This year all of our elected officials have served and鲱ely. It is a privilege to present this to the Alumni.

"I shall now turn the meeting over to Hall Addington, who will be President of the Colorado School of Mines Alumni, Inc., for the year 1970-71.

President Hal Addington accepted the transfer of authority with the statement that in his opinion, Bill Johnson had been an outstanding president. During Mr. Johnson’s term of office much had been accomplished, and this was recognized in the motion passed by the Board of Directors to add his name to the list of Outstanding Alumni.

President Addington then said, "As evidence of our high esteem and appreciation, it is my privilege to present you with a Mines chair. It is hoped that you will be able to relax in comfort now that your successful term of office has come to an end. This chair will mark the reason for this gift. There being no further business, the meeting will adjourn and festivities of the evening may begin."

C. S. M. Alumni Foundation, Inc.

Statement of Condition

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AIME Committee Chairmen for 99th Annual Meeting

AIME Committee Chairmen for AIME's 99th Annual Meeting, Feb. 15-19 in Johannesburg, S. Africa. The papers and panels are as follows:

AIME CommiHee

Annual Meeiing

posium, Reception; 99th Amiual Meetmg, Feb. 15-19 in Johannesburg, S. Africa.

Mr. Cahalan was born and educated in Australia, graduating B.Sc. (Eng) in metallurgy from Adelaide University and obtaining the associate diploma of the South Australian School of Mines in the following year.

After working for one year with Adelaide Chemical and Fertilizer Co., Mr. Cahalan joined Rona Antioch Copper Mines early in 1947. He first came to England in mid-1946 and worked for a short period on tin recovery from dumps in Cornwall. From 1943 until 1949 he was employed by the Department of Atomic Energy, Ministry of Supply—Atomic Energy Research Establishment, Harwell, England, to develop standards for tunnel shapes; thirdly, to prepare standards for tunnel shapes; finally, to develop tunneling equipment and accessories which would be a major step forward in improving tunneling efficiency. The three themes of the conference will be tunnel utilization, exploration, design, construction and standards. Further information is obtainable from the Organizing Committee, TUNCON 70, POB 101X, Johannesburg, South Africa.

If you've worked enough up with the Joneses, just think of the world can be a girl who is free for herself! Fury: "Did you see much poverty there last night?" Traveler: "See it? I brought a lot of money with me!"

The Nuclear power plants included in this map are ones whose power is being transmitted or is scheduled to be transmitted over utility electric facilities, for a total of 57 nuclear power facilities. The map includes the states and several foreign countries, which are represented by the following notation:

B: 8 more plants have been announced. This map is being supported by the Antelope Historical Society, Rosamond, Calif., and a man named Dennis Armstrong.

Tenth Annual World Gold Panning Contest was held at the Tungsten Mill, Mill, and Museum near Roosevelt, Calif., May 3 and 4, 1970. Entrants come from numerous countries. Winners of Open, Ladies and Junior classes receive gold nugget-decorated trophies. The event is sponsored by Kirk Armstrong, owner of the Mill, and by the Kern County Chamber of Commerce, and Trego Pipe Gold Co.

Nuclear Power Plants in the United States

The Nuclear power plants included in this map are ones whose power is being transmitted or is scheduled to be transmitted over utility electric facilities. Seven units of each reactor type have been licensed but in each case they were limited to program for which they were licensed.

The nuclear power plants included in this map are ones whose power is being transmitted or is scheduled to be transmitted over utility electric facilities, for a total of 57 nuclear power facilities. The map includes the states and several foreign countries, which are represented by the following notation:

B: 8 more plants have been announced. This map is being supported by the Antelope Historical Society, Rosamond, Calif., and a man named Dennis Armstrong.
The Colorado School of Mines Alumni Placement Service functions as a clearing house for alumnae and former students who wish to receive current information about employment opportunities for which they may be qualified. It also serves the oil, gas, construction and related industries and many government agencies by maintaining current listings of openings they have for qualified engineers, technical and management personnel.

Companies needing qualified men with degrees in Geological Engineering, Geophysical Engineering, Metallurgical Engineering, Mining Engineering, Petroleum Engineering, Engineering Physics, Engineering Mathematics, and Chemistry are invited to list their openings with the OSM Alumni Placement Service, Guggen-heim Hall, Golden, Colorado.

Listed below are coded references to the graduates of the Colorado School of Mines who were available for employment at the time this issue of the MINES MAGAZINE went to press.

<table>
<thead>
<tr>
<th>Client's Code Number</th>
<th>Degree</th>
<th>Year</th>
<th>School</th>
<th>Location</th>
<th>Preferred Fields of Work</th>
<th>Languages Spoken</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN 32</td>
<td>Mining</td>
<td>30</td>
<td>M</td>
<td>West U.S.</td>
<td>Project Mgmt./Ops. Mgmt.</td>
<td>English/Spanish</td>
</tr>
<tr>
<td>MN 48</td>
<td>Mining</td>
<td>30</td>
<td>M</td>
<td>East U.S.</td>
<td>Engineering</td>
<td>English/Spanish</td>
</tr>
<tr>
<td>MN 49</td>
<td>Mining</td>
<td>30</td>
<td>M</td>
<td>Southeast U.S.</td>
<td>Mine Eng./Submarine</td>
<td>English</td>
</tr>
<tr>
<td>MT 41</td>
<td>Metallurgy</td>
<td>30</td>
<td>M</td>
<td>Alaska / Western U.S.</td>
<td>Mine Operations</td>
<td>English</td>
</tr>
<tr>
<td>MT 42</td>
<td>Metallurgy</td>
<td>30</td>
<td>M</td>
<td>Alaska / Western U.S.</td>
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<td>English</td>
</tr>
</tbody>
</table>

Companies seeking graduates for employment should contact the Alumni Placement Service for a complete list of available graduates.

Engelhard Minerals & Chemicals Corporate Research Headquarters

Engelhard Minerals & Chemicals Corp. has broken ground in Menlo Park, Calif., for a 10,000-barrel-per-day refinery. The new unit will substantially increase the amount of premium gasoline produced at the plant. The refinery's polymerization unit will produce 60 per cent of the refinery's output in 1972. When in operation, more than 80 per cent of the refinery's output will be sold in advance on a long-term basis.

Newfoundland Refining Co. Ltd. in St. John's, Newfoundland, has signed an agreement with W. R. Grace & Co. in which W. R. Grace will add a portion of Silver Bell's holdings at Crooks, Wyo., 15 miles from the Crooks Gap district, reported Dec. 16.

The American Israel Chemical Co. has received the first shipment of raw materials from the new unit of Stansteel Corporation.

Phosphate Mining Installation
In Israel's Negev Desert

The American Israel Phosphate Corp. has completed all preliminary planning for a phosphate mining installation in the Negev Desert area in Israel. The company expects to install approximately $8 million worth of phosphate a year, with initial shipments scheduled for 1972. When in operation, more than 200 people will be needed to operate the mine.

Denver Approves Plastic Pipe

Denver, Colo., is the latest of the nation's major cities to pass use of acrylics-butylenes-styrenes (ABS) and polyvinyl chloride (PVC) pipe and fittings for drain, waste and vent systems in dwelling-type occupancies.

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Dr. Lynch Promoted by Dow

Dr. Edward J. Lynch, senior research engineer at the Dow Chemical Co.'s Walnut Creek (Calif.) Research Center, has been promoted to associate research scientist. There is only one higher position which Dow scientific staff attain when recognized for actual research work.

Lynch, who joined Dow in 1958, has been recognized as an internationally known expert in the evaluation of petroleum reservoirs, and has principally related his work to geophysical recovery of ore from petroleum reservoirs. His activities have resulted in improved chemical processes for Dow.
Contact drill rigs. The new "Boo" Beginner is a lightweight, rugged, conventional drill rig developed by Merle Deering Co., St. Louis, Missouri. It is designed for general purpose drilling and is ideal for the smaller operator. The rig is equipped with a two-speed, two-stage, mud agitator. A new pump for the mud tanks has been added, and a second hose is available. The rig is powered by a four-cylinder, air-cooled engine. It is available in two models, the 300 and the 400. (N.E. Deering Co., Box 1006, St. Louis, Mo. 63114.) Circle 429 on Reader Service Card.

Pressurized storage bins (344) are being marketed by Conair Corp., Newark, New Jersey. The bins are designed to store and meter dry materials. They are available in various sizes and can be used for a variety of applications. The bins are equipped with a pressure gauge and a timer for automatic operation. They are made of stainless steel and are designed to withstand high temperatures. (Conair Corp., 4000 Raritan Ave., Piscataway, N.J. 08854.) Circle 430 on Reader Service Card.

Infrared detectors (345) are being marketed by the Refractometer Division of Infraspec, Inc., 92-20 46th Ave., Long Island City, N.Y. 11101. The detectors are designed for use in the infrared region of the spectrum and are capable of detecting small changes in temperature. They are available in a variety of models and are suitable for use in a wide range of applications. (Infraspec, Inc., 92-20 46th Ave., Long Island City, N.Y. 11101.) Circle 431 on Reader Service Card.

Send us your bulletins. Send your publication to THE MINES MAGAZINE, 2177 W. 7th Ave., Denver, Colo. 80204, and we will include them in our regular feature. To be considered for inclusion, bulletins should be in a standard format and should include detailed information on the equipment or process described.

Belt filter (346) is being marketed by the Denver Equipment Division, Joy Manufacturing Co., Joyville, Pa. 15224. The filter is designed for use in a variety of applications, including mining and mineral processing. It is capable of handling large quantities of material and is designed to be durable and reliable. (Joy Manufacturing Co., Joyville, Pa. 15224.) Circle 432 on Reader Service Card.

Radar detection (347) is being marketed by the United States Government through the Federal Aviation Administration. The radar is designed for use in air traffic control and is capable of detecting the position and movement of aircraft. It is available in a variety of models and is suitable for use in a wide range of applications. (Federal Aviation Administration, Washington, D.C. 20520.) Circle 433 on Reader Service Card.

In line instrumentation (348) is being marketed by the Division of Nuclear Medicine, University of California, Berkeley, Calif. 94720. The instrumentation is designed for use in the field of nuclear medicine and is capable of detecting the position and movement of radioactive materials. It is available in a variety of models and is suitable for use in a wide range of applications. (Division of Nuclear Medicine, University of California, Berkeley, Calif. 94720.) Circle 434 on Reader Service Card.

ROTARY SCREW SENSOR (331) is an electronic device designed to detect changes in the position and movement of objects. It is capable of detecting small changes in position and is designed to be durable and reliable. (Magnum Instruments, Inc., Fullerton, Calif. 92634.) Circle 435 on Reader Service Card.

Polycrystalline roddon (332) is a new material developed by the General Electric Company. The roddon is designed for use in a variety of applications, including electrical and electronic devices. It is available in a variety of models and is suitable for use in a wide range of applications. (General Electric Company, Schenectady, N.Y. 12301.) Circle 436 on Reader Service Card.

Un-A-Trac hauler (337) is a new type of equipment designed for use in mining and mineral processing. The hauler is capable of handling large quantities of material and is designed to be durable and reliable. (James M. Bird Co., Tulsa, Okla. 74112.) Circle 437 on Reader Service Card.

Off-road vehicle (339) is a new type of equipment designed for use in mining and mineral processing. The vehicle is capable of handling large quantities of material and is designed to be durable and reliable. (Koehring Company, 2177 W. 7th Ave., Denver, Colo. 80204.) Circle 438 on Reader Service Card.

Vibratory feeder (338) is a new type of equipment designed for use in mining and mineral processing. The feeder is capable of handling large quantities of material and is designed to be durable and reliable. (Eriez Magnetics, 3807 Madison Ave., Indianapolis, Ind. 46227.) Circle 439 on Reader Service Card.

Polyethylene electrocatalyst (334) is a new material developed by the Union Carbide Corporation. The electrocatalyst is designed for use in a variety of applications, including electrical and electronic devices. It is available in a variety of models and is suitable for use in a wide range of applications. (Union Carbide Corporation, 300 Commerce Blvd., Great Neck, N.Y. 11024.) Circle 440 on Reader Service Card.

Haist for Trucks (343) is a new type of equipment designed for use in mining and mineral processing. The equipment is capable of handling large quantities of material and is designed to be durable and reliable. (Haist Corp., 5900) Westport, Conn. 06880.) Circle 441 on Reader Service Card.

WANT MORE INFORMATION? Use MINES Magazine's convenient READER SERVICE CARD, circling numbers that correspond to items interested in, drop card in mail. No stamp needed!

February 1970—THE MINES MAGAZINE
There is continued discussion by youth using the term of "anti-establishment," which seems to have complete meaning to them. When they try to explain it to me, it usually ends with "It's a catchphrase you know." Finally, I still don't know, but perhaps Red Fenwick's definition used in his column, "If you can't beat them, beat them up," is a liberal system of business and government, because a liberal wants to accept all that it can give you.

Two SDS students spoke to a luncheon meeting to explain the most important point was their hostility attitude to the government. During the question hour which followed they were asked where they lived and how they came to campus. In reply they said, "We live in Florence and camp out by car."

The next question asked was: "How would you have arrived here, or anywhere else, if you carried out your program of destruction?"

Recently David Brookins wrote in his book, "The Decline of Man ,"..." picture of our America becomes clearer, more detached. In a paroxysm of self-abasement, our respectable leaders oscillate in the extremes of a few to cure post-war society by creating present ones."

Edward Bondfield in The Underworld City, suggests that the liberal do-gooders of the last decade have made themselves feel good and protected themselves to political power while in fact, intensifying the problems of society.

Perhaps the groundswell of change is vaguely hinted at by the question of the first impulse of returning her lover.

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McLeod made Exploration-Production Planning Manager for Cities Service Oil Co.

J. M. BIRKY, B.S., M.S., P.E., 1957, has been promoted to manager of the exploration-production planning department of Cities Service Oil Co., subsidiary of Cities Service Co., New York.

McLeod's duties as manager will include a wide range of exploration-planning and evaluation functions for the exploration-production group, including budgeting, economics, statistics, project planning and personnel planning. He has been serving as exploration-production planning coordinator.

A native of Shreveport, La., Mr. McLeod joined Cities Service Oil Co. in 1957, following his graduation from the Colorado School of Mines.

During the next six years McLeod was a production engineer in Columbus and Liberty, Tex., and in Russell, Kan., and was also a division staff engineer in Great Bend, Kan.

Between 1953 and 1957 McLeod was on leave of absence from the company to attend the Graduate School of Business at Harvard University, where he received his master's degree in business administration.

Upon his return to the company he served first as an economic analyst on the executive staff and then as a planning staff member of the corporate planning division. He joined the exploration-production planning department in summer of 1968.

McLeod has a wife, Nancy, and two sons.

He is a member of the Society of Petroleum Engineers and the Tulsa Chamber of Commerce, serving on the governmental affairs committee.

McLeod is active in youth athletics and is a vestry member of St. Dominus Episcopal Church.

Elkins Receives Certificate of Appreciation as Officer of Service

L. LINCOLN F. ELKINS, B.S., P.E. 1940 & Master's 1965, was honored Nov. 7 by the Production Division of the American Petroleum Institute.

Elkins, technical advisor to the Exploration manager, South Oil Co., Oklahoma City, has been with the company since 1940. For the past 23 years he has been in API's Production Division, serving as an advisor to the Exploration Manager.

Elkins holds the API Certificate of Appreciation.

Elkins, technical advisor to the Exploration manager, South Oil Co., Oklahoma City, has been with the company since 1940. For the past 23 years he has been in API's Production Division, serving as an advisor to the Exploration Manager.

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Walter J. Allinger

WALTER J. ALLINGER, B.M.E., 1953, who for many years was an associate engineer, Materials Department, Colorado School of Mines, died at his home in Denver (1825 S. Vrain St.), July 31, 1989. Mr. Allinger graduated from East High School in Denver in 1948 and received his B.S. in geology from Colorado School of Mines in 1953. He joined Anaconda Co. as a consultant as chief of research for International Nickel Co., and transferred to the Anaconda Co. as an engineer, metalurgist, and technical staff assistant in 1965.

In Memoriam

Reginald G. Bowman

REGINALD G. BOWMAN, Met. E., 1911, employed by The Anacosta Co., Ltd., Pittsburgh, Pa., as general superintendent, died Nov. 15, 1989, of his home in Cleveland Heights, Ohio. He is survived by his wife, Helen, and by his parents, who resided in Santa Barbara. Born Sept. 17, 1886, in Pueblo, Colo., Mr. Bowman received his Metallurgical Engineering degree in 1911 from the Colorado School of Mines. He came to Mines in September 1968, to work on his Master's degree. After graduating from Mines, he worked for Anaconda Co. for 30 years as a consultant as chief of research for International Nickel Co., and transferred to the Anaconda Co. as an engineer, metalurgist, and technical staff assistant in 1965.

Robert Allen Watson

ROBERT ALAN WATSON, a Mines geology graduate student, was killed in an airplane accident in Colorado on Monday, Dec. 4, 1989. The crash occurred on an icy mountain range near Denver. Watson's truck apparently slid off an embankment through a snow-covered area.

Bob, as he was known by his friends, received his B.S. in geology from Western Kentucky University and was a member of Gamma Xi Nu. He was scheduled to graduate in December 1989.


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Harry C. Bullack (1954)

FEBRUARY, 1970—THE MINES MAGAZINE

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Anchorage, Alaska Section Formalizes Their Meetings

The latest addition to our list of local sections is in the fiftieth state. During the visit this part summer of Dr. Robert Baxter, professor emeritus, the group in Anchorage decided to formalize its meetings, which had been held over a period of years.

As a result the Anchorage, Alaska Local Chapter became a reality, and throughout Alaska, and throughout America. A special group of alumni honored during the luncheon included Dr. Joseph W. Lee, Geophysicist, 1907, who was elected secretary-treasurer of the group. His address is c/o U.S. Army Petroleum Co., Northern Alaska District, 680 NO. 4th Avenue, Anchorage, Alaska 99501.

Frits Attends Weekly Luncheon Of Arizona Alumni Section

Frits Brenncke, CSM director of Athletics, recently attended the joint conventions of the National Collegiate Athletic Association and American Football Coaches Association meetings on the 3rd Monday of each month, beginning the luncheon included, Percy I. Stephens, 1913; Harlow D. Phelps, 1910; William F. Dukes, 1907, the next annual luncheon meeting will be held on Monday, Dec. 7, 1970, at the Westerner Hotel, Tuscon, during the Arizona AIME Section meeting. The annual Spring picnic is the Section's next scheduled activity.

"I blame my lawyer for my being sentenced to jail," said the felon. "He kept yelling at the jurors that they should give me justice until he finally provoked them into doing it."

From the Local Sections

Section news should be in the Alumni Office by the 20th of the Month preceding Publication.

FEBRUARY, 1970—THE MINES MAGAZINE
42

The Colorado School of Mines recently completed a revision of its ROTC curricu-

lum. The revised curriculum will be presented during the current school year.

The most significant changes occur in the Basic Course presented to the freshmen and the sophomores. The in-
tent is to provide more engineering subjects during these years thereby increasing the course value and inter-
est to all students.

Spring Semester Evening Courses

Continuation of evening courses for employed individuals and part-time students are again being offered by the Colorado School of Mines in Golden, registration for the 32 courses was Jan. 30 at CSM's field house.

Three different classifications of students are being admitted: (1) stu-
dents without degrees may take undergraduate work only and must apply through the Admissions Office, (2) students with a degree must apply to the Coordinator of Continuing Educa-
tion and may take undergraduate and graduate courses, and (3) reg-
ular full-time CSM undergraduate students may become part-time students through permission from the Dean of Students.

The following departments are offering 3, 5, and 4 semester hour courses for the spring semester, Feb. 5 to May 18, 1970:

Basic Engineering, 4 courses; Chemical and Petroleum-Refining En-
vironmental, Ecological, and Engineering Education, 5 non-credit courses; Geology, 4 courses; Geophysics, 4 courses; Mathematics, 6 courses; Metallurgy, 1 course; Petroleum Engineering, 3 courses, and Physics, 3 courses.

Weimer, an active member of many scientific and geological soci-
eties, is the author of some 50 publications. In 1967, he was chairman of the Rocky Mountain Section, Geological Society of Amer-
ica, and has served as President of the Rocky Mountain Association of Geologists.

Bruce Taylor and Dale Bingham, will present a leadership laboratory program on the following topics:

• Leadership
• Effective Communication
• Conflict Resolution
• Decision Making
• Team Building
• Time Management

The new program will be developed for the graduates of the School's Commission on Leadership in the Basic Course presented to the freshmen and the sophomores. The in-
tent is to provide more engineering subjects during these years thereby increasing the course value and inter-
est to all students.

Weekend courses offered during the current school year include:

• Geology and Environmental Science
• Petroleum Engineering
• Environmental Science and Policy

The Colorado School of Mines has a full-time faculty of approximately 100, including 40 professors, 40 associate professors, and 20 assistant professors. The student body consists of approximately 2,500 undergraduates and 500 graduates from the United States and abroad.

The ROTC program offers leadership opportunities for cadets to develop skills in decision-making, critical thinking, and problem-solving. Cadets are also provided with opportunities to participate in community service projects and leadership training exercises.

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The following departments are offering 3, 5, and 4 semester hour courses for the spring semester, Feb. 5 to May 18, 1970:

Basic Engineering, 4 courses; Chemical and Petroleum-Refining En-
vironmental, Ecological, and Engineering Education, 5 non-credit courses; Geology, 4 courses; Geophysics, 4 courses; Mathematics, 6 courses; Metallurgy, 1 course; Petroleum Engineering, 3 courses, and Physics, 3 courses.

Weimer, an active member of many scientific and geological soci-
eties, is the author of some 50 publications. In 1967, he was chairman of the Rocky Mountain Section, Geological Society of Amer-
ica, and has served as President of the Rocky Mountain Association of Geologists.

Bruce Taylor and Dale Bingham, will present a leadership laboratory program on the following topics:

• Leadership
• Effective Communication
• Conflict Resolution
• Decision Making
• Team Building
• Time Management

The new program will be developed for the graduates of the School's Commission on Leadership in the Basic Course presented to the freshmen and the sophomores. The in-
tent is to provide more engineering subjects during these years thereby increasing the course value and inter-
est to all students.

Weekend courses offered during the current school year include:

• Geology and Environmental Science
• Petroleum Engineering
• Environmental Science and Policy

The Colorado School of Mines has a full-time faculty of approximately 100, including 40 professors, 40 associate professors, and 20 assistant professors. The student body consists of approximately 2,500 undergraduates and 500 graduates from the United States and abroad.

The ROTC program offers leadership opportunities for cadets to develop skills in decision-making, critical thinking, and problem-solving. Cadets are also provided with opportunities to participate in community service projects and leadership training exercises.
Rock Mechanics Seminar at CSM February 23-27

This third annual rock mechanics seminar to be sponsored by Kelley Products Division, CHIC-Cross International, Inc., will be held in cooperation with the Colorado School of Mines. The special school will be held at Golden, Colo., from Monday, Feb. 23, through Friday, Feb. 27. Attendance at this seminar will take in full or any portion of the program and gain useful knowledge of the subject. A limited number of trips will occupy part of the rock systems.

Upon completion of the rare-earth abundance patterns, this information will be coupled with other elemental and isotopic abundance data therefore gaining new insights into the nature of geochemical differentiation in igneous and sedimentary materials. These rare-earth elements are important and trace element indicators of processes in igneous and metamorphic rocks.

Neutron activation analysis will be performed using the facilities of the Mark III TRIGA reactor and the nuclear laboratory at the U.S.G.S. center in Denver. Dr. William P. Hall, the officer in charge, will be the principal investigator for the two-year project ending Dec. 31, 1971.

Oredigger Stats As of Jan. 11

The Orediggers, with a season of 7-3 thus far and 1-1 in RMAC play, are the story of the season up until the last week of the year. Following are the following team statistics. During the past 10 games Mines has averaged 85.2 points per game and held its opponents to an average of 72.2 points per game. Mines has averaged 46.4 rebounds per game and 50.8 rebounds per game. Mines has averaged 14.9 assists per game and 14.8 assists per game. Mines has averaged 13.5 steals per game and 12.7 steals per game. Mines has averaged 12.6 blocks per game and 10.9 blocks per game. Mines has averaged 7.3 turnovers per game and 8.1 turnovers per game.

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Operations Research Symposium at Mines

The Colorado School of Mines and the Institute for Operations Research offered a three-day symposium, Jan. 24-26, entitled "Operations Research for Immediate Application." The symposium was aimed at focusing on the use of mathematics in problems of both theoretical and practical problem solving. Implementation of proven techniques was demonstrated via the Computer Center on the Mines campus in Golden.

This program was designed to acquaint recent management of engineers and technical personnel with varied techniques and applications of operations research. The purpose of the Institute is to educate and influence the vast array of men who are responsible for the efficient functioning of organizations. The symposium was attended by 100 business and industry executives, many of whom had little or no experience with mathematical techniques.

Operations Research, a non-profit organization serving as a vehicle for industrial consulting, software development, and short course presentation, was founded by Dr. W. W. Whitman with Dr. E. D. Wosley as principal scientist. Both men are professors at the Mathematics Department at the Colorado School of Mines.
84 Students Earn Degrees Jan. 15, 1970

The program consisted of an invocation by the Rev. John A. McHenry, Presentation of Degrees Candidates by Edward J. Johnson, '49

Petroleum Geology

FEBRUARY 1970—THE MINES MAGAZINE

Dear Wendell:

The coverage in the Mines Magazine, August 1969 Edition, of "Miners" breakfast meetings at the convention is a very nice idea indeed. It gives all the proceeds, without hesitation, to the Charity, which is one of the best ideas that you leave behind with us. However, I think it would be a good opportunity to meet the people and talk to the hotel guests, the friends the prospect of years of care.

Thank you and best regards.

R. W. MacCannon

The sponsors of the fair expect about 50-60 entries so I would think that if possible, we should have enough literature for each one. Hopefully, we can do some good.

Sincerely,

Larry Smith, '31

Principal Engineer

Department of State

Dear Wendell:

The following of the grindmg units in the same order, excepting the first order, should be forthcoming by the end of the year. With the completion of the recent Philex concentrator of 4,000 tons per day.

In behalf of the Department of State, for which you have contributed so much in the past years, I wish you much success and I hope that you will enjoy the advantages and opportunities to which we have given you for your own and consistent success.

With cordial regards,

H. K. VAN POLDER

For best results in dyeing

DON'T RUSH THEM

The Mines Magazine is a pleasant and consistent source of news with "Home", "class" and "school" activities. Mail me and I read every word. I have never been more pleased, and I appreciate your services more. I appreciate your services very much and I hope you can keep up the good work.

Best regards to both you and Classie.

Sincerely,

H. A. and M. J. Schmidt.

Department of State

P. O. Box 1-353, Tulsa, Okla. 74114

Dear Wendell:

The Sciences Fair in Wyoming for high school teachers and high school students in being held March 14th in Greenvale. In connection with this event, we thought it would be a good opportunity to meet the people and talk to the people. I hope that you will enjoy the event and that it will be a success.

Sincerely,

Dr. Childs; and a benediction by the Reverend Mitchell, Eben M. Makonese

R. W. MacCannon

MetMtl. '51, Superintendent

/lc/ Phoenix Mining Corp.

P. O. Box 359, Mesa, Philippine Islands

FEBRUARY 1970—THE MINES MAGAZINE

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Today, C&F means steel. We manufacture, in plants in Colorado, New Jersey, Massachusetts, and California, a complete line of pipe and tubing for the U.S. and foreign markets.

Our plants are located in the most productive areas of the country. We make quality steel products that serve every major industry in America as well as international markets. Today steel is an essential part of the American way of life. But our steel can be known for a lot besides steel. We welcome and invite the President of the C&F Steel Corporation, Box 1920, Denver, Colorado 80201.

What's next for you . . .

In behalf of the Department of State, for which you have contributed so much in the past years, I wish you much success and I hope that you will enjoy the advantages and opportunities to which we have given you for your own and consistent success.

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