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THE MINES MAGAZINE
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Calendar
Society of Petroleum Engineers of AIME Annual Convention, Houston, Tex., Oct. 4-7.
consolidation materials Engineering Congress and Exposition, Cleveland, Ohio, Oct. 19-22.
SME Fall Meeting and AIME World Lead Zinc Symposium, Kent Audito-rium, St. Louis, Mo., Oct. 21-22.
Seminar on Pollution ("For Lead's Sake"), sponsored by Environmental Sciences Inc., Pittsburgh, Pa., Nov. 9-11.
78th Annual Convention of North-west Mining Assn., Davenport Hotel, Spokane, Wash., Dec. 4-5.

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You couldn’t find a prettier place to build anything. From a jagged crest in the Sierrita Mountains of southern Arizona, the words came easy for S. H. (Ham) Martin, general manager of metallic operations for Duval Corporation. What he saw even from this vantage point, however, was only a portion of Duval Sierrita Corporation’s $166 million copper-molybdenum-silver property now coming into initial production after 25 months of pre-mining, mill construction and other work. Unless airborne, there is no single vantage point from which you can see all of Sierrita.

The beauty Ham Martin described came from the slowly changing hues as the morning sun brushed the mountainsides. It came, too, from the Santa Cruz river valley to the east and from nature’s mix of cholla (jumping cactus), palo verde trees and the ever present mesquite that dot this rugged region of the Southwest.

In terms of total investment and sheer size it is the largest mining property ever developed by the company. Sierrita will—

- Process 66,000 tons of ore daily
- Become the largest copper mining and milling facility in Arizona and the second largest in the U.S.
- Make Duval the second largest domestic producer of molybdenum
- Mark fulfillment of a cooperative effort between private enterprise and the federal government
- Provide some 1,100 permanent new job opportunities for residents of the area in the company’s mining and milling operations

Sierrita’s role in future revenues for Pennzoil United can also be told without great length: expected copper output of some 130 million pounds per year during its first five years of production and 150 million pounds annually (Continued on Page 6)
POWER SHOVEL BUCKET drops approximately 23 tons of copper-molybdenum ore into 1600 HP haul truck. When fully loaded, the haul truck will carry 120 tons of ore. Each truck tire is 48-ply, stands nine feet high and weighs 3000 pounds.

in subsequent years; plus 13 million pounds of molybdenum annually; plus approximately 50,000 ounces of silver a year.

None of which will be done easily or cheaply. Sierraita's 414 million ton ore body has an average content of 0.35% copper and 0.036% molybdenum—levels considered unprofitable to mine only a few years ago. The world's growing need for copper, plus rapidly improving technology, however, has brought about a re-evaluation of the economics of developing such low-grade ore deposits.

As Resident Manager J. P. McCarty puts it, "We'll get everything out but the squeal." Judging from the gargantuan equipment now roaming this rugged mine site 24 hours a day, and a layout of ore processing facilities as modern as any in the world, there is no reason to doubt his view.

Sierrita's closest business address would be tiny Sahuarita, Arizona, which straddles I-10 some 20 miles south of Tucson and only 47 miles north of the Mexican border. Sahuarita's two taverns, one grocery, one service station and a post office offer a rather sleepy facade for the busy mining operations that go on in the mountains only a few miles away.

Duval put its first metals property (Esperanza) in production in 1959 approximately ten miles southwest of Sahuarita. Even while the Esperanza open pit copper-molybdenum mine was being readied for production, Duval's exploration team continued to investigate and make ore evaluations of the surrounding region—and to purchase additional mining claims. The team laid the foundation for this $166 million Sierrita project that has now been developed just west of the Esperanza mine.

Duval's exploration and preliminary development program delineated an ore body of 414 million tons with an average copper content of 0.35 percent (seven pounds per ton) and an average molybdenum content of 0.036 percent (0.72 pounds per ton). Engineering pit designs indicate that a total of 634 million tons of waste must be handled prior to and during the mining of the 414 million-ton ore reserve. This total of over a billion tons of ore and waste which will be mined, of which 131 million tons were removed during the pre-mine stripping operations, represents more than twice the tonnage excavated in the construction of the Panama Canal.

Mining—It is anticipated that the eventual perimeter of the Sierrita open pit will encompass an area of approximately 400 acres. As presently designed, the pit will ultimately reach a depth of 1850 feet below the highest elevation of the pit area prior to mining. Such an ultimate depth will represent a distance of almost one and one-half times the height of the Empire State Building.

Mining is accomplished by establishing a series of levels or benches, each bench being approximately 50 feet high. The first step in the mining cycle is the blasting of the various benches. To blast a bench, rotary drills drill holes 59 feet in depth and from nine inches to 12 1/2 inches in diameter. (Continued on Page 8)
Blast holes which contain water are loaded with a gelatin explosive in cherry form. Holes which are dry are loaded with a mixture of ammonium nitrate and fuel oil. A typical blast consisting of detonation of the explosive in 40 blast holes results in 75,000 pounds of explosives to break 200,000 tons of rock. A blast of this size provides enough broken material to keep one power shovel in production for approximately four days.

Mining Equipment and Facilities—The mining equipment features six power shovels equipped with 15 cubic-yard buckets and 12 haul trucks of 100-ton capacity. These shovels and trucks are among the largest presently used in the copper mining industry. In addition, six rotary blast-hole drills, 12 dozers and numerous other units such as motor patrols, fork lifts, cranes, water trucks, personnel buses and miscellaneous small trucks supplement the operation. Service facilities consist of two modern shops, steam cleaning pad, change room and offices.

Because the power shovels and haul trucks are among the largest used in the industry, some pertinent facts concerning these units are of interest.

Power Shovels—1. The weight of each shovel is approximately 450 tons; 2. Shovels are rated at 750 HP and have a sign capacity of 72,000 tons of ore per day, and its associated facilities are expected to cost approximately $100 million. This capacity will be greater than that of any single copper-molybdenum concentrator in North America. The construction of plant facilities, as originally designed, were completed by mid-1970. In May, 1970, an agreement was reached with the USA for a $12 million expansion at the Sierra Nevada property. This expansion program, when completed in 1971, is expected to increase significantly the mining and milling capacity at the property.

Concentrating—Primary size reduction of the mined ore is achieved by two 60-ton by 49-inch gyratory crushers located near the south perimeter of the Sierra Nevada open pit. The crushers, which reduce the mine ore to about 65 per cent minus six inch, have a total operating capacity of 5000 tons per hour. The crushed ore is transported by a 54-inch wide belt conveyor to a 40,000-ton coarse ore open storage—an overland distance of about two and one-half miles.

Power and water are supplied by two 600-volt, 5000-horsepower electric motors. The maximum power consumption is about 10,000 horsepower.

Haul Trucks—1. The weight of each truck is five to seven years, after which replacement is anticipated.

(Continued on Page 10)
CONCENTRATOR BUILDING IS NEARLY AS LONG AS THREE FOOTBALL FIELDS. Final ore grinding takes place in the 14 cylindrical ball mills (left center). The ground copper-molybdenum ore then goes to the 602 flotation machines (foreground) where it is separated mechanically and concentrated.

The ore from the fine-ore storage is wet-ground in 14 16-foot diameter by 19-foot-long ball mills driven by 300 HP motors. The ball mills operate in a closed circuit with cyclone classifiers. The ground ore in an ore-water slurry, after being conditioned with reagents, is introduced into flotation machines which produce a low-grade (rougher) concentrate of copper and molybdenum minerals.

The rougher concentrate is then re-ground in two 13-foot diameter by 19-foot-long regrind ball mills that are operated in a closed circuit with cyclone classifiers. The rougher concentrate is floated and re-floated to a final concentrate. A total of 602 flotation machines are used in the copper-molybdenum concentration. The tailing from the flotation process is thickened before disposal in four 350-foot diameter rake thickeners, the water, which is recovered from the slurry, is re-used in the process. The concentrate is thickened in 100-foot diameter thickeners.

The combined copper-molybdenum concentrate is then subjected to flotation to separate the two products. The concentrate is strained and conditioned with reagents before flotation. In the first flotation, the copper minerals are depressed and the molybdenum floated. The copper concentrate is the tailing from this flotation and, after thickening in a 125-foot diameter thickener, is de-watered in four drum filters and loaded in open gondola railroad cars for transporting to the smelter. The molybdenum is further concentrated by cleaning and re-cleaning stages of flotation. The final molybdenum concentrate is filtered, dried and stored for packaging for marketing as molybdenum oxide or for roasting in two 23-foot diameter multiple-hearth roasters. The roasted product, molybdenum trioxide, is packaged and marketed as technical molybdenum.

Production—Production from the Sierrita Property as originally designed is expected to average 130 million pounds of copper annually during the first five years of operation and 150 million pounds thereafter. In addition, the property will produce approximately 13 million pounds of molybdenum and 500,000 ounces of silver annually. With Sierrita’s production, Duval Corporation will rank fourth among United States copper producers and will be the second largest producer of molybdenum in the United States. Peak employment during development of the Sierrita Property was 2400. Average employment during production will be 1100.

Utilities—Electric power and natural gas is supplied by a local utility company. Power requirements are expected to be approximately 60,000 kilowatts and 500,000 cubic feet per month. This amount of power would supply a city of 100,000 population.

Natural gas requirements are expected to be some 150 million cubic feet per month with all but a fraction of the gas being used in roasting molybdenum sulfide concentrate into the oxide form.

When you can hardly hear yourself think, it’s time to think about noise.

Noise won’t kill you. But before it leaves you deaf, it may drive you crazy.

Noise is pollution. And noise pollution is approaching dangerous levels in our cities today.

People are tired of living in the din of car horns and jackhammers. They’re starting to scream about noise.

Screaming won’t help matters any. But technology will. Technology and the engineers who can make it work.

Engineers at General Electric are already working to take some of the noise out of our environment. One area where they’re making real progress is jet-aircraft engines.

Until our engineers went to work on the problem, cutting down on engine noise always meant cutting down on power. But no more.

GE has built a jet engine for airliners that’s quieter than any other you’ve ever heard. A high-bypass turbofan. It’s quieter, even though it’s twice as powerful as the engines on the passenger planes of the Sixties.

And NASA has chosen General Electric to find ways of cutting engine noise even further.

It may take an engineer years of work before he can work out the solution to a problem like noise in jet engines. And it may be years before his solution has any impact on the environment.

But if you’re the kind of engineer who’s anxious to get started on problems like these and willing to give them the time they take, General Electric needs you.

Think about it in a quiet moment. Or, better yet, a noisy one.

GENERAL ELECTRIC
An equal opportunity employer
A bucket wheel excavator, shovel, and draglines are used by Derek Crouch to recover 6 seams of coal, from 15 to 56 in. thick, between outcrop and a maximum depth of 230 ft on the Radar North project in Northumberland County, England. Restoration immediately follows excavation.

Surface Mining & Restoration English-Style

By R. K. Singhel
B. Sc. (Mining), Ph.D.

One of the more interesting as well as one of the largest opencut coal mines in Europe is the Radar North project at Widdrington, near Morpeth, in Northumberland County, England. Operated since 1957 by Derek Crouch (Contractors) Ltd. under contract to Tyne Authority, it is the center of an area estimated to have 80 million tons of coal.

The 2,000-acre Radar North coal site which stretches for 2 miles along Druridge Bay on the North Sea, about 23 miles due north of Newcastle upon Tyne, is expected to produce more than 10 million tons of good quality coal. It is presently producing at a rate of more than 25,000 tons per week.

This will involve the moving of 200 million cu yd of overburden material consisting of surface soil, boulder clay and rock, then restoring the area according to a prearranged plan.

Regional geologic conditions

The area involved is located near the extreme northeast rim of the Northumberland Coal Field. The six seams which outcrop in the area occupy horizons in the lower half of the Middle Coal Group in the Productive (Carboniferous) Coal Measures. As the direction of regional full dip is southeastwards, the outcrops trend in a northeast-southwest direction. They dip at a rate of 1 in 10 to 1 in 25. The two seams to be recovered, the Queen and Little Wonder, will be worked from the outcrop to a depth of approximately 100 feet.

The succession of strata in descending order is:
1. Little Wonder—27 in.
2. Queen—48 in.
3. Cheevey—15 min.
4. Main, (of Broomhill)—56 in.
5. Top (of Broomhill)—32 in.

Coldrife geology

This area lies north of a major fault known as the Causey Park Dyke. The fault, which has a WSW-ENE trend, separates Coldrife from Radar North which presently is working about 1½ miles to the south.

The Coldrife area is generally free of major faulting, but prospecting operations have indicated several WNW-ESE trending faults with throws up to 15 ft and additional minor faults at right angles to this general trend.

The dip of the coal beds is radial, ranging from SW through E to ENE in the southern section and from NE to N to NW in the northern section. The maximum rate of dip is 1 in 12, with the normal variation from 1 to 3 to 1 to 25. The two seams to be recovered, the Queen and Little Wonder, will be worked from the outcrop to a depth of approximately 100 feet.

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Radar North geology

The geological structure of this area is dominated by a series of three NE-SW trending normal faults which, downthrowing inward, form a stepped trough where the vertical displacement varies from 20 to 70 feet. This has generated dips in all directions but the general trend is south-easterly at a rate of 1 in 15.

The interval rocks between the coal seams are conventional Coal Measure shales, mudstones and sandstones. Though subject to faulting, these interval rocks are not unduly fragmented or weathered.

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Above: A 10-ft lift of shale in the Radar North working area is excavated by a Bucyrus-Erie 150-B, 6-yard shovel and loaded into Caterpillar 767B, 35-ton rear dump trucks for disposal.

Main seam
30 to 80 ft—shales and sandstone

Top seam
2 to 25 ft—shales, sandstone and fire-clay

Bottom seam
25 in.—Cheevely seam

Glacial drift or boulder clay covers the entire area. It varies in thickness from a few feet to 90 feet. The thickness increases from the minimum in the extreme southern sector to the maximum along the northern perimeter. In the preglacial buried valley just north of the northern perimeter the glacial drift is 130 feet deep.

The indicated thickness of the coal seams gives no idea of the variation in thickness nor the behavior or incidence of bands. For example, the thickness. In addition there are serious problems which may have as many as three bands, one

Main seam varies from 33 to 82 in.

Cheevely seam
3 feet in advance of the dragline work cuts 100 feet wide, with the excavated spoil banks. All of the 40-ft conveyors used in the system are read

Big Geordie can dig 150 feet below its shoe level, dump at 130 feet above this level, and cast spoil 233 feet.

When its thickness exceeded 40 feet it could not be handled in a single lift by a shovel loading trucks for transpor
tation to spoil heaps or to final dispos
dal to disposal on spoil bank areas. To split it into two lifts would mean having the trucks travel on a clay bed, an almost impossible task.

It was decided to use a bucket wheel excavator to remove the glacial drift and feed it to a system of mova
tible conveyors for disposal. This operat
ving procedure was initiated in No
vember 1961 and has since proved to be both practical and economical. The amount of material handled averages 2 million cu yd annually.

The bucket wheel excavator, de
signed and manufactured by Fried Krupp, Maschinen und Stahlbau, Rheine
hausen, Germany, has an 18-ft wheel

tined to 60 percent of the total answer was to cast the material to a 1768-ft face in advance of the dragline work, by a 150 feet below its shoe level, dump at 130 feet above this level, and cast spoil 233 feet. This will be used in the deeper excavations.

In the Coldrife area the Queen and Little Wonder seams are excavated by two Bucyrus-Erie 1150-B draglines equipped with 180-ft booms and 27-yard buckets.

The incoming power to the screening and blending plant is provided by 1550-W dragline is 11,000 v.

The contractors on the Radar North project are discharging their responsibility under this policy in a progressive and orderly manner. As illus

Landscape renewal

The National Coal Board expects open-cast coal operators to leave the land in better shape than before work was started. This involves correction of dereliction from past coal mining, removal of pit heaps and incongruous mounds of old deep-mining are blend
ed into the new landscape. The ram
bling A1068 road has been given a new alignment as part of a 16-mile new alignment as part of a 16-mile

*Reprinted through the courtesy of Coal Mining & Processing, No. 9, Adlers A, Chicago, Ill., November 1970.
Backfilling Abandoned Coal Mines

A CONTRACT for backfilling abandoned coal mines under a square block area of Rock Springs, Wyo., has been awarded to Dowell Division of The Dow Chemical Co., Awarding of the contract by the City of Rock Springs follows feasibility studies including a demonstration with model equipment and some exploration, and financial commitments to carry out the project in an effort to prevent subsidence.

Backfilling of the water-filled mines in the single block area, which will require some 20,000 cubic yards of material, is expected to begin between Oct. 19 and Oct. 20. Amount of the contract is $173,140.

Known officially as the Rock Springs, Wyo. Mine Backfilling Demonstration Project, it represents a culmination of months of study and preparation and is a joint effort of private industry and governments. Participants include the U.S. Bureau of Mines, the State of Wyoming, the Union Pacific Railroad and Dowell Division of Dow.

Total funds committed to the project amount to $472,500. Some state funds are being held for future use in other backfilling operations in the city.

Subsidence problems have been experienced from time to time in Rock Springs in the past. However, concern over the abandoned mines, operated in the early 1900's, began in earnest in early 1969 when the ground above Springs in the past. However, concern over the abandoned mines, operated in the early 1900's, began in earnest in early 1969 when the ground above

“THERE is an energy crisis facing this nation because of the shortage of fuels. There are five energy fuels—water power, oil, gas, coal and nuclear power, and only coal has the known reserves to supply the expanding energy requirements of this country in the years immediately ahead. In order for the coal industry to meet this challenge, the industry must attract thousands of energetic and knowledgeable young men into the mining industry,” said James R. McCartney, director of Community Relations and Civic Affairs for Consolidation Coal Co., at a recent dinner honoring the 24 college students who were summerline employees of Pocahontas Division-North.

Mr. McCartney said that Consolidation's 32 operating divisions with mines in seven states employed over 300 college students this summer from 70 different colleges and universities. Forty per cent of these college men are studying mining engineering or other engineering courses.

He said that Consolidation Coal Co., the largest coal company in our country, has over 15,000 employees, over 30 operating mines and 10 new mines under development. By 1975, with these new mines in full production, Consol hopes to produce over 80 million tons of coal annually. This would be a 30 per cent increase in production over the company’s 60 million tons produced last year.

He stated that Consol urges young men to enroll in post high school mining engineering training, either through vocational schools or by obtaining a four-year college degree in mining. He emphasized that Consol offers scholarships, employment to any young man studying mining engineering in college. He also said that an excellent way for a young man to obtain a mining engineering degree is through the co-op program, whereby the student alternates by semester attending college and working in the mine, thus obtaining practical experience and also earning sufficient money to pay for his college education.

Mr. McCartney said there are hundreds of mining engineering jobs available every year in the coal industry and he predicted that coal production will increase from the present 550 million tons per year to 750 million tons by 1980 and a billion tons a year by the end of the century.

He reviewed some of the challenges facing the coal industry and urged these young college men to obtain their college education and then apply their youth and knowledge in helping the coal industry provide the ever increasing energy fuel requirements facing this nation.

Come make a future with us.
Anaconda: one of the great natural resources of the Americas.

Gulf's got problems like you wouldn't believe.

Like mass producing food from hydrocarbons. (So nourishment can be produced without soil or sunlight).

And improving processes for keeping air and water clean. Converting nuclear energy into electric power.
Locating 2½ million barrels of oil per day.
Developing adhesives for the outer skin of the SST.
Discovering exotic new uses for raw ethylene.
Making synthetic fuels from shales and tar sands.
Mining high-grade uranium economically.
Finding new uses for marginal petroleum products.
Perfecting time-release capsules for fertilizer.
Improving reverse osmosis systems used in desalination.

Gulf's young engineering grads are hard at work today on these problems. And many more.

If you want to get involved with a company that's really involved, send us the coupon today.

An Equal Opportunity Employer

Mail to: Virgil Hanson, Gulf Oil Corporation, P. O. Drawer 2100, Houston, Texas 77001
A Water Diversion Tunnel
Driven in Coal

By Arthur E. Falvey

At Lake DeSmet, about 15 miles north of Buffalo, Wyo., an unusual project is in progress. Included in this project are diversion works on Piney Creek, a water diversion tunnel, and construction of a new dam at the north end of Lake DeSmet. This project was started during the latter part of 1969 by Reynolds Mining Corp.

The tunnel under construction runs through a seam of coal 135 feet thick and is ranked as sub-bituminous "C." Two 10' shafts have been sunk by boring machine—one 165' deep and the other 100'. These shafts are being connected by an 8' foot tunnel 8,390 feet long, also using a boring machine.

At the present time the tunnel is over 3,100 feet. 24" air shafts have been driven at 300 feet intervals along the tunnel center line to comply with Wyoming Coal Mining law, the tunnel advance every 300 feet. An elevator is installed in the 165' shaft for the convenience of the men. A crane is provided for material.

The coal has a tendency to slake in over 3,100 feet. An exhaust fan on the surface is moved ahead as the tunnel advances every 300 feet. An elevator is installed in the 165' shaft for the convenience of the men. A crane is provided for material. The shafts are lined with one foot of concrete and were poured monolithically.

Concrete is prepared at the centrally located batch plant with all mixes carefully controlled. The concrete is lowered on one-yard dump buckets and poured into leaks in the slip form. This form is raised at the rate of one inch every two minutes by a series of hydraulic jacks, all controlled from a central panel on the surface.

Removal of the material from the mining machine is unique. A conveyor moves the material to a hammermill, where it is mixed with water and fed into a pump. This pump moves it to two pumps placed in series at the bottom of the shaft. Two settling ponds in series are fed by these pumps. Overflow from the second pond enters a pond which is the feed supply for the water underground. A well provides make-up water to this pond.

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The outlet area for the water at Lake DeSmet calls for the construction of a 40 foot high dam to be located north of the present dam. When this project is completed, the level of the lake will be raised 10 feet.

We need action-seeking graduates with degrees in most fields for management opportunities in sales...production...research...engineering...finance...administration...or you name it. Think it over. If you have high aspirations and a good record, take time to find out about a career with us.

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Coal Industry Threatened
By Oil Import Policy

In the face of an accelerating trend toward increased imports of residual fuel oil, the Government must take steps to ensure that alternate domestic supplies of fuel are available to keep electric power plants and other industrial plants on the East Coast operating in the event of an emergency cutting off shore oil supplies, a House Subcommittee studying the Nation's oil import program was told by a spokesman for coal producing and transporting industries.

W. W. McClanahan, Jr., executive vice president of the National Coal Policy Conference, told the House Interior Subcommittee on Mines and Mining that more than 85 percent of all the residual fuel oil consumed on the East Coast is imported—close to 450 million barrels in 1969—and that strong efforts are now being made to open the interior of the Nation to imports via the Mississippi River.

One result of the availability of unlimited amounts of imported residual has been that more and more power generating plants have converted their fuel burning facilities to use only oil. The question of how these plants could be kept operating in the event the foreign oil supplies are cut off because of developments outside the control of this Nation is one that raises serious national security implications and demands the immediate attention of top Government officials responsible for developing policies related to fuels and energy, he declared.

As a first step, Mr. McClanahan urged that the recently created Oil Policy Committee, headed by Office of Emergency Preparedness Director George H. Lincoln, conduct a study to determine just how serious the problem created by the lack of alternate fuel burning facilities in power plants and other essential industries, and to take steps to preserve the dual fuel burning capabilities of essential industries.

The second step, he said, should be a revision of present policies which permit unlimited residual imports in favor of a quota system, based on present record import levels, which recognizes that imported oil must be permitted to share in, but not dominate, the growth in the East Coast market for heavy industrial fuel.

Mr. McClanahan said that the increase in residual imports had destroyed "any incentive" for developing domestic fuel supplies to serve the East Coast market.

"We recognize that an immediate roll-back of present import levels would be both impracticable and impossible," he said. "We do, however, urge that the government adopt a new policy looking toward encouragement of the development of domestic fuels to supply East Coast market. In this way, the serious national security problem this situation has created could be gradually overcome."

The increased demand for low sulfur fuel to meet air pollution control requirements has added to the pressure for increased residual imports, Mr. McClanahan told the committee.

The drive to open the Midwest to imported residual oil for the first time is, in many respects, a reflection of the Nation's air pollution control program, he added.

Yet, by encouraging utilities and other fuel consumers to rely on imported fuel to meet pollution reduction requirements, the government is discouraging and delaying the "most logical and best long-term solution," which Mr. McClanahan said, is the development of air pollution control technology to permit the continued and expanded use of coal.

For this reason, Mr. McClanahan said, a revision in current residual oil import policies is imperative.
some years ago the concept of total energy was advanced and several of the major petroleum companies entered into the field of coal mining and uranium production. The research was immediately stopped to initiate the crisis that was to develop with the middle east imbalance.

With the explosion in the middle east, petroleum resources, that had been having European, and to a lesser extent, U.S. industries to invest in the new fields of coal and uranium production, companies moved into the fields of coal mining and uranium production. (1969-1970) because of the lack of natural gas to fire the plant's furnaces.

The article stated: "That little-received event may have come a little sooner than might have been expected. Hence, the two years' experience of using and serving more coal than was produced."

"In this picture came clean-air regulations, limiting emissions of sulfur dioxide, in effect, outlawing coal and oil with more than one percent sulfur. New rules, including federal, state and local, may impose limits ranging in local instances to as low as 0.5 percent sulfur this fall."

"Considerable volumes of low-sulfur residual have become available, especially from African sources. But not enough. And, coincidently, the years of drilling for reserves due to low gas prices had resulted in reserves declines of 1968 and 1969, just when the world had been short of coal. The effect of this, and the fact that natural gas consumption six fold, some plants of Consolidation Coal's made of Liquefied Natural Gas and Russian coal. This could happen if oil became too expensive. The stability in overseas sources of supply made the nation's look to their own backyard.

"Continued Middle Eastern crises will make other hydrocarbons sources - extra heavy oil, for example - that had been sold or spurned as industries and utilities sought new supplies, in effect, to replace, with U.S. customers having to pay more and with demand less than usual. Then this spring a crimp was put on the supply of both these fuels. New coal mine safety regulations resulted in closing a large number of mines, especially in the northeastern states which were said to be uneconomic under the new law."

The article also noted that the closing of the oil fields, oil and gas conservation and curtailment by Idahos of production has resulted in a tightening of the world market. The article mentioned all of these situations, plus others, had already on the years in the coal industry, either in its prospects as such or in its use for making synthetic oil.

"If the Nixon Administration can solve the riddle of these twin developments, it will have taken a giant step toward easing the current energy crisis and avoiding another soon."

"It has been this switch by utilities away from coal that has put unusual pressure on gas and residual supplies. Gas supplies are critically short. A similar situation exists for residual fuel because of the tankers shortage. Domestic refiners, who practically have quit making residual because of its low price, probably can crank out enough fuel to meet this emergency. But it will be very expensive. The switch will process prices.

The Denver Post (Sept. 27, 1970).
Goodbye, lake.

Remember that afternoon you took your girl and guitar down to the lake?
The water was filled with garbage. And the smell matched the scene.
Pollution.
It blows the image. The ecology. Everything.

FMC is a billion and a half dollar corporation, one of the nation's top 100. We're in chemicals, fibers, metalworking, mining, and a lot of related activities.

No surprise then that we're in waste treatment and water pollution control, too.
For ourselves. For everyone.

FMC builds sewage treatment equipment for the biggest cities, and the smallest. Every community doesn't use a treatment system, but we wish they would.

FMC engineers also solve waste treatment problems for industrial plants. Some industries are doing a good job. But a lot still needs to be done.

Our environmental laboratory and our chemical research center are searching for more effective materials and working on new treatment concepts. We have some of the best systems available.

By pooling talents in our diversified company, we're giving rivers and lakes a new lease on life.

If you'd like to do something about things that need doing, write for our brochure, 'Careers with FMC.' Or pick up a copy from your placement office. FMC Corporation, Box 760, San Jose, California 95106.

We're an equal opportunity employer.

FMC CORPORATION
Putting ideas to work to make water beautiful
Early Days in the San Juan

(Editor's Note: This interesting account of the early days in San Juan-Silverton-Eureka District was written by John M. Stieritz to his friend, Guy L. Smeaton, then president of the Denver Mining Club and owner of the Treasure Mountain Gold Mining Co.)

I HAVE dug up some old records of the good old days when I lived in the San Juan. Wonderful days! Days of hope, disappointment, hardship and more hope. But all that, it was a great life. Good health, some successes and strong faith, in all we needed the world and we had only just to rid of our selfishness, we would be far happier in the possession of these blessings than to break down our health by 20th century selfishness. We know we need anyhow, and if we could only get rid of our selfishness, we would be far happier in the possession of these blessings than to break down our health by 20th century selfishness.

"The mine was in a bad condition —poison and gas everywhere. I put two of these men and began straightening it in condition to mine and was very busy for some weeks time branding and sampling. They had a very complete laboratory and assay equipment and I assayed all material found in place as well as waste with which the workings, except the main shaft, were filled. There seemed to be many small dumps to the right of the claim. I made a list of equipment needed to work the mine and found it to be a piece of jewelry with a very high grade diamond set in it, probably worth 500 in life, I never learned who lost it.

"After we drove to Ouray, I thought I heard a horse's behind behind my ear. This was quite a coincidence that occurred to me early one evening while on my way home. I was working on the Mill at the Golden Fleece, hearing a horse behind me coming on a rapid gait and being hailed by the rider. The man apologized for the sound of the horse and said he was trying to indicate that he was coming. I thought I might enjoy his company as I was about to enjoy mine, so we rode together to the Burro Bridge where we parted, taking the Old Trail while on continued to his property, the Camp Burt, of which he was the owner. I always admired Tom Welch, and I think of him every day.

"Thank you for your good letter, and I wish you great success, which I believe will be yours if you ever 20th century selfishness.

"Some of the names you mention I still recall others only vaguely. I recall the Stickers who owned the bank in Silverton and the Silver Lake and the Iowa Tiger. When in Silverton last September as I walked the streets of that old town, many faces, names and incidents of the old days came before my view. It seemed to me that I recognized the incident that occurred to me one morning when I stood in the doorway of the old Grand Hotel waiting for the "first call" for breakfast. While watching the stream of water flowing in the gutter, it was always an attraction to me, my attention became centered on something shining on the board sidewalk. I picked it up and found it to be a piece of jewelry with a very high grade diamond set in it, probably worth 500 in life, I never learned who lost it.

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Baja in Trip of '68

Baja has always been a challenging destination, and when Charles Saltzer, a 1967 Metallurgical Engineering graduate from the School of Mines, returned from South Vietnam in June 1970, he and a colleague decided to visit the Baja peninsula. The trip was a challenge and an adventure that they took on at a senatorial level to the 39th Congress group, which included a senatorial group of friends. The trip was made from July 25 to August 4, 1968, which was sent to us by Ralph Wolf.

The trip started as a group of friends, including Charles Saltzer, who had been thinking about it for about a year. They crossed the border into Mexico at Rosarito and set out to explore the Baja desert area for about 21 days. They managed to get through with the first leg of the journey, and they were determined to finish the trip.

The group laid on a Volkswagen buggy from 4443 Ocean Drive, and they loaded it with camping equipment, extra water and 28 gallons of gasoline. They had been thinking about the trip for about a year. They managed to get through with the first leg of the journey, and they were determined to finish the trip.

First Trouble—The first problem that occurred was on a dirt road near Torreon. The brakes went out on the buggy, and they were preparing to board the ferry boat to take them across the Gulf of California to La Paz. They had been thinking about the trip for about a year. They managed to get through with the first leg of the journey, and they were determined to finish the trip.

The story occurred on Saturday morning, October 16, when they tried to get stuck on a dirt road. They had been thinking about the trip for about a year. They managed to get through with the first leg of the journey, and they were determined to finish the trip.

“Bottomless sand” said the adventurers while they were preparing to board the ferry boat to take them across the Gulf of California to La Paz. They had been thinking about the trip for about a year. They managed to get through with the first leg of the journey, and they were determined to finish the trip.

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The trip concluded on Saturday, October 16, when they crossed into Mexico at Rosarito. They told of getting stuck, trying to get through with the first leg of the journey, and they were determined to finish the trip. They managed to get through with the first leg of the journey, and they were determined to finish the trip.

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Robert D. Longyear Dies

Robert D. Longyear, honorary chairman of the Board of Directors of the E. J. Longyear Co., well known internationally throughout the mining industry, died in Minneapolis on May 20, 1970.

In 1934, he received his B.A. Degree from Williams College, and in 1936 his M.S. Degree in mining engineering from the University of Wisconsin. He began his professional career with Longyear as geologist in charge of the highly successful diamond core drilling exploration program at the famous Falunbrorget nickel deposit near Sudbury, Ontario. He held the office of president from 1934 to 1938 and was then elected chairman of the Board of Directors, a position he held until early 1950 when he became honorary chairman.

Robert Longyear devoted his entire adult life in service of his fellow men and the business community of which he was an outstanding member. He was through his wise and skilled leadership that the E. J. Longyear Company has become a successful international company and a leader in the development and manufacture of diamond core drilling equipment and the largest world-wide supplier of contract drilling services.

Consolidation Coal Promotions

Two top Eleven Vaughn, vice president of Consolidation Coal Co., Ralph B. Bailey, vice-president, and Charles R. Nalle, vice-president and general manager, were named to the board of directors of the firm.

Brown & Root Appointment

Brown & Root, Inc., has announced the appointment of John T. O'Rourke as manager-Mining and Metalurgical Sales. In this capacity, he will be responsible for coordinating and directing Brown & Root's overall added-value activities in the ferrous, non-ferrous, and mining industries.

O'Rourke is a graduate of Drexel Institute of Technology, a professional engineer licensed in the state of New York, and attended graduate school of Columbia University. Brown & Root of Houston, the nation's largest engineering and construction company, is a subsidiary of Halliburton Co., Dallas.

New Chemical Techniques

For Pollution Control

A breakthrough in bringing new chemical techniques for pollution control into practice has been announced by American Cyanamid Co., as it reached full-scale production at its new sulfuric acid plant in Linden, N. J.

The plant, together with new air pollution control facilities for other production units at Cyanamid's Worthington plant complex in Linden, involved an investment of some $60,000,000.

Thomas P. Turcan, Met.E., 1935, Cyanamid vice-president, attributed one-third of the company's recent investment in air pollution control devices. He said the sulfuric acid plant is the first of its type in the Western Hemisphere with respect to pollution abatement.

WORLD'S LARGEST PORTABLE COMPRESSOR manufacturing plant, including a new nu­

tritional machinery facility of Ingersoll-Rand Co.'s Port­

town factory, has been announced by the company's Mayville, N. C., subsidiary. It is involved at a recent dedication, the company's 100th birthday, at West Point of North Carolina. A blast of compressed air served as a new cornerstone for a major new expansion of the compressor side of the company's manufacturing facilities which has been under way for some time.

CAR SHAKER (406)

A new type of car shaker is described in this bulletin from the E. J. Longyear Co., mining division. It is equipped with automatically controlled feed mechanisms which are synchronized with the feed cycle at the beginning of the charge. It is also equipped with an automatic shaker control which automatically provides the correct amount of feed for each charge. Circle 416 on Reader Service Card.

Deputy Chambers (407)

A breakthrough in bringing new line-drawing and mechanical equipment to the mining and tunneling industries is the new line of Chambers. These Chambers have been designed specifically for use in mining and tunneling operations. They are made of heavy-duty steel and are equipped with a variety of features to meet the specific needs of the user. Circle 417 on Reader Service Card.

STEEL RIBBON CABLES (408)

The new line of steel ribbon cables offers a number of advantages over conventional cable designs, including greater strength, improved flexibility, and reduced installation time. The cables are available in a variety of sizes and can be customized to meet specific customer requirements. Circle 418 on Reader Service Card.

System Engineering (409)

A new system for the design and development of custom systems is introduced in this bulletin. The system integrates a variety of technical disciplines, including engineering, manufacturing, and sales, to provide a comprehensive solution for customers' needs. Circle 419 on Reader Service Card.

A new full-color 6-page catalog on PRC Fab­

products is now available free from General Automation, Inc., 26300 Fargo Ave., Bedford Heights, Ohio. The catalog features a wide range of PRC products, including presses, presses, pumps, and other equipment for the mining and manufacturing industries. Circle 420 on Reader Service Card.

A new device, a "baby computer" marketing service, is now available from the ESCO Equipment Co., 100 Park Ave., New York 17, N. Y. The device is designed to help crane operators; daily, weekly, monthly and annual reports and other information. Readers are encouraged to request the service. Circle 421 on Reader Service Card.

A handy, pocket-sized booklet titled "Great Machine's Capabilities To Best Advantage In Special Situations" is now available from the ESCO Equipment Co. The booklet represents the results of more than a year's study of recommended crane usage and includes a variety of case studies. Readers are encouraged to request the booklet. Circle 422 on Reader Service Card.

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Send Your Bullelins

Send your bulletins to THE MINES MAGAZINE at the address below. They may be used in our column giving samples and material prior to unloading. The catalog describes the company's various products and their request for the equipment. Circle 423 on Reader Service Card.

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Catalogs and Trade Publications

GRAVITY CONCENTRATOR (412)

A new gravity concentrator is introduced in this bulletin from the E. J. Longyear Co., mining division. It is designed for the beneficiation of fine and coarse ores. The concentrator is available in a variety of sizes and can be customized to meet specific customer requirements. Circle 424 on Reader Service Card.

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Available to the Colorado School of Mines Alumni, their families and friends

A VACATION TO REMEMBER FOREVER

HAWAIIAN PARADISE

EIGHT EXCITING CAREFREE DAYS IN PARADISE

3 nights in HONOLULU

HONOLULU PARADISE

All the exotic adventures of Hawaii await your exploration. Tour with us, or do your own thing. You'll find shops like no others in the world. No sand is whiter than the famous beach at Waikiki. No mountains are more commanding than those that greet the pale colored beaches. At this and more start with an Aloha Party. Four days and nights in Honolulu will be accommodated by the comfortable accommodations at the famous Hilton Hawaiian Village or other luxurious hotel.

2 nights in MAUI

MAUI PARADISE

• Flight to jet hop to one of the most beautiful islands in the world. In route to your hotel you will visit a valley floor giving rise to the majestic Kauai Needle—you'll enjoy the best cup of coffee in the world made right on the spot from the famous Kona coffee bean. It will be served at the beautiful Kona Hilton or other luxurious hotel. Then to...

HOLD PARADISE—Your Kona visit will end with a scenic trip across the big island of Hawaii to Hilo where you will explore the colorful Orchid Fields, the incredible volcanic crater and cascading waterfalls. The majestic slopes of 13,704 foot Mauna Kea will serve as your backdrop. And then a jet liner for the flight back to Hilo with all the memories of the most wondrous vacation imaginable.

391 plus $24 tax and services, based on double occupancy

Departure from Denver on Saturday, November 7, 1970 via Western Airlines

MINERALS INDUSTRIES

Exploration Practices

Code Endorsed by CMA

The Colorado Mining Association Board of Directors has endorsed the following "Code of Exploration Practices." An evidence of our concern that a quality environment be maintained and the protection of the land be achieved in adapting to sound ecological practices as we search for new mineral deposits, we voluntarily subscribe to the following "Code of Exploration Practices," as recommended by the Colorado Mining Association and will use our best efforts so that all of our employees and contractors comply with it.

1. Know and comply with the mining laws relating to exploration in Colorado.
2. Know and comply with Forest Service, BLM or other appropriate government agency's rules and regulations.
3. Establish and maintain cordial relations with land owners and/or lease holders in the area of the activity.
4. Avoid harmful impacts upon the environment.
5. Keep excavation (roads, drill sites and camps) at a minimum.
6. Cooperate with the land owner who may wish to manage or manage forests and grass lands.
7. Keep vehicles and conduct other activities in a manner such as to minimize disturbance of people and livestock in the area.
8. Do not hunt or fish on private lands except by the permission of the land owner.
9. Use number, water or other resource on private land without permission of the owner.
10. Promptly initiate negotiations with the owner for settlement of any claims for damages resulting from activities of the exploration group or contractors.

Copies of the "Code" with space for endorsement by other companies are available for distribution through the Colorado Mining Association, Majestic Building, Denver, Colo. 80202 and the Colorado Bureau of Mines, 215 Majestic Building, Denver, Colo. 80202.

Anthracite Mining Services

Receipts for anthracite mining services in an open pit mine are audited by 8.72 mill, a decrease of 0.4 million from 1969 and 0.62 million from 1968. This is the last high annual tonnage Gains of Anthracite Industry, according to a preliminary report of the Census Bureau just issued by the U.S. Department of Commerce's Bureau of the Census.

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- Aids with data reduction, trend analyses, interpretation.

J. Kent Perry, '58
Geological Engineer
HAZEN RESEARCH, INC.
4601 Indiana Street, Golden, Colorado USA 80401
Phone 303/279-4847 TWX 914-934-0199
The Grand Junction Section held its annual picnic sponsored by the CSM Alumni on Fourth of July weekend in 1970. The picnic was held at the home of Elbert E. Ray, 7915 Exchange Ave, Chicago 17, Ill. The Coors beer was missing because of some decision here in Golden which did not ship the usual supply to this special occasion. In the name of Charles T. Baroch. Twenty-five dollars of this amount will be used to purchase a brass name plate to appear under his class numeral in the Integral Club. Other gifts to this fund will be accepted by the CSM Foundation, Inc., as received — WWP.

### Grand Junction Section Officers Elected at Swim Party

At the 1970 Grand Junction Section of the CSM Alumni held a swim party at the home of Elbert E. Ray, Class of '42. As usual, a good turnout was recorded and a grand old time was had by all.

The results of the nominating committee members were presented in a possible manner by Tony Setzer, '32. The following Alumni were unanimously voted into office for the succeeding year:

**President:** Robert F. Barney, '35

**Vice-President:** Earl (Mighty) Vonn, '41

**Secretary-Treasurer:** Robert P. Moston, '66

There being no further formal business, this portion of the meeting was adjourned.

Arch F. Floyd, '26, retired from government service in July. Arch was given a fine farewell party by his fellow AEC employees. We all wish him a lot of happiness during his retirement years.

—Roy C. Kirkman

### Charles T. Baroch Memorial

Shocked by the death of Charles T. Baroch, class of 1923, who had been an officer of the Washington, D.C., Section for many years, the local members contributed $2,000 as a gift to the CSM Foundation, Inc., to establish a Memorial Fund in the name of Charles T. Baroch. Twenty-five dollars of this amount will be used to purchase a brass name plate to appear under his class numeral in the Integral Club. Other gifts to this fund will be accepted by the CSM Foundation, Inc., as received — WWP.

### Candidates for Alumni Offices

Candidates for CSM Alumni offices in 1971 are Harrison L. Hays, '21, for president; Neal Hare, '54, for vice-president; Robert W. Dalton, '22, Albert Seep, '58, and Arthur G. Wilmes, '49, for secretary; Arthur B. Biddle, '43, David B. Cole, '50, and Theodore R. Young, '82, for director (3-year term); Harold W. Addison, '49, for director (2-year term).

Washington, D.C. Section Holds Its Annual Picnic

The annual picnic sponsored by the Washington, D.C., Section was held at the home of James C. Hurvitz, 21, in Great Falls, Va. Over the years, the number of Mines Alumni in Washington has become smaller, Earl (Mighty) Vonn was at the picnic together with a substantial number of others. The Coors beer was missing because of some decision here in Golden, not to ship the usual supply to this special occasion for a group of special occasion.

### From the Local Sections

#### Section news should be in the Alumni Office by the 20th of the month preceding Publication.
### Personel Placement

**THE COLORADO SCHOOL OF MINES ALUMNI PLACEMENT SERVICE** functions as a clearinghouse for alumni and former students who wish to receive current information about employment opportunities for which they may qualify. 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 managerial personnel.

Companies needing qualified men with degrees in Geological Engineering, Geophysical Engineering, Metallurgical Engineering, Mining Engineering, Petroleum Engineering, Petroleum Refining Engineering, Engineering Physics, Engineering Mathematics, and Chemistry are invited to list their openings with the CSM Alumni Placement Service, Guggenheim 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>
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<tr>
<th>Client's Code Number</th>
<th>Degree</th>
<th>Area</th>
<th>Protein Fields of Work</th>
<th>Locality</th>
<th>Languages Spoken</th>
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<td>MN 24</td>
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could not locate any light blasting wire so initiated a few hundred feet of stranded single sterd 12/3 copper wire instead. Unfortunately we stripped it off the end of the coil creating a beautiful coil spring with just enough gentle tension to draw the small amount of dirt forward. Being behind us; the charge if I remember, was five sticks. Well, when the sound ceased, I touched the wires to the battery and created the greatest and most powerful shower bath in history of salt water, chunks of freezing and some excrement from a couple of scared experts. We enjoyed this later without having a lot, and we did collect a lot of everything, but not any desire to repeat the project.

Aug. 6, 1970

Dear Col: Fortuitous Thanks to my good friends, Linda, Evan and I have arrived on overseas contact with Kaiser Engineers in Perth, W. A. After Oct. 1st we'll settle into our rented house which has no furniture. We change positions for a few weeks from here to Be in W. A. we'll expect

Kellenherz Sales Representative
For Jefferson Chemical Company

R. P. KELLENHERZ, P.E., B.S.
has been appointed sales representative, Houston District, for Jefferson Chemical Company, succeeding Mr. J. C. Dingman, Houston district manager. Mr. Kellenherz has had previous assignments with Jefferson in market research and international operations. He holds a Petroleum Refining Engineering degree from the University of Houston.

A. J. MANCINI Assistant Director
Of Wyo. Water Planning Program

J. A. Mancini, Assistant Director, A. J. Mancini, Geo-
has been appointed assistant director of the Wyoming Water Planning Program. Mr. Mancini is fill-in attendance for the position vacated by the

Wicks Smelter Superintendant
For Blackwell Zinc, Inc.

has been promoted to the position of smelter superintendent at Blackwell Zinc, Inc., an operating unit of the AMAX Basic Metals Group and a subsidiary of American Metal Clas-

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Alumni Headlines

OCTOBER, 1970 • THE MINES MAGAZINE

Colin M. Reardon, P.E., M.Eng., E.M. 1960

42
Mr. and Mrs. Robert Norris of 8311...tion of Officer Training School at...1961 graduate of North Denver High...Tactical Air Command which pro...Miller of 5195 W. 14th Ave., Denver,...44 believe something, whisper it.

At Mountain Home AFB...Lt. W.E. Miller Stationed...J 1965, son of Mr. and Mrs. Roy J. Donohoo Witi Direct TGS's...Knight Elected V-P Operations...Charles T. Baroch

Charles T. Baroch

Charles T. Baroch, E.M., 1923, died in Arlington, Va. Long...Spielman Appointed Manager...Charles T. Baroch...

Say Mama: "You can't marry him. ...he worked as a consultant with Pittsburgh & Midway but as a result of his new position, he will be transferred to the coal company...L. Sarto will be manager of the West...Knights cobra Populor Engineer in Kentucky, Kentucky Division. He is a Registered Professional Engineer in Kentucky, Missouri, Kansas and New Mexico and a member of the American Institute of Mining, Metallurgical and Petroleum Engineers. Mr. Knight will continue to be headquarter ed in Pittsburgh & Midway offices in Kansas City. At the same time, Mr. Zagnoli announced the establishment of an Eastern, Central and Western Operating Division and the appointment of a manager for each division. Mr. Carl L. Sarto will be in charge of the Eastern Division and Mr. Charles O. Spielman will be manager of the Western Division...

Patterson Ears Promotion At Inland Steel Plant

ERVERT M. PATTSON, JR., 1927, died in Jersey City, N.J., was born in Jersey City, N.J., but earned his metallurgical engineering degree at Ohio University, Athens, Ohio. He was employed by several mining and industrial companies throughout the West for 27 years. During this time he did pioneering research on the hydrodynamics of oxide-cap removal for the Bagdad Copper Corp., Hilisilde, Ariz.

In 1940, he entered service with the U.S. Bureau of Mines at Boulder City, Nev., to participate in the development of research programs on strategic metals. Subsequently he was promoted to superintendent and later to assistant chief of the Boulder City (Nevada) Experimental Station. Especially noteworthy was his contribution to the development of a process for the preparation of alumin um from potassium alum. He also made major contributions to the development of the commercial process that is used for the extraction of uranium from weathered monazite sands. The method, which he has developed on his own, is used by several companies today. He was a member of the American Institute of Mining Metallurgical and Petroleum Engineers, the American Chemical Society, the Society of Mining Engineers, the Minerals, Metals and Materials Society and the World Mining Congress. His research was published in numerous journals.


Milton M. Levy

MILTON M. LEVY, E.M., 1916, has been reported as us hav ing died but there is no record as to date of his death. Mr. Levy had been living in Los Angeles, Calif., but was employed by the Deese Date Co. at Indio, Calif.
Gerald H. Parkinson

Gerald Boy Parkinson, E.M., 1939, of Rhoades and African Chrome Mines until his retirement a few years ago, died Sept. 16. Parkinson was director of Union Carbide, Baton Rouge, La., and came to Rhoades 41 years ago. He was a member of the Pittsburgh Lodge No. 25, Knights Templar, Past Master.

Since then he had been chairman and a director of Sable Chemicals, Que. Corp., and a director and consultant for Rhodesia Chromium Development Corp., Blackmore, Ont., and was a member of the council of the Great Western Intensive Conservation Area committee.

In 1938 Mr. Parkinson married Miss Margaret Futer of Somabula, and is survived by his widow, Mrs. Alice C. Deaton of Lakewood, Colo.; a son, Russell S. Parkinson of Fort Worth, Tex.; a brother, J. M. Parkinson of Battle Creek, Mich.; and four grandchildren.

Class Notes

Robert A. Ausmus, E.M., 1932, took early retirement from Bremkom, Inc., April 1, and moved back to Joplin, Mo. about the middle of June 1970. He writes: "Having lived in Joplin for many years and liking the mid-West seemed reason enough to re-establish here. If I can be of any help in this general area let me know. Arthur's address is: 2220 Carolina, Joplin, Mo. 64801.

Lewis E. Brekmamp, E.M., 1939, has returned to the Philippines for a short period. The Brekmamps expect to be in their home at Hot Springs National Park after Dec. 1, 1970. Their address at that time will be 212 Hardin Dr., Hot Springs National Park, Ark., 71911.

John B. Boletino, E.M., 1942, has resigned from Benouit Consolidated, Inc., to become mining engineer at Santa Ines Steel Corp. He will also be doing consulting work on a fee basis.

Hugo Riecken

Hugo RIECKEN, P.E., 1928, died May 27 at his home in Denver. He was 68.

Riecken was born Sept. 4, 1903 in Colorado Springs, Colo., Mr. Riecken attended elementary and secondary schools there. In 1926 he enrolled at the Colorado School of Mines and in 1901 earned a degree in Petroleum Engineering. For a number of years he was employed by oil and gas companies in the Denver area. He was for a time assistant superintendent of Shelly Oil Co.'s natural gas pipeline at Seminole, Okla. In the early 1930s he joined Phillips Petroleum Co. in Fort Worth, Okla., where he served for many years in the company's Industrial Relations Department.

Mr. Riecken is survived by a son, Robert J. Rieeken of Lakewood, Co., and a granddaughter, Cheryl Rieeken of Denver, Colo.

The Mines State Fair exhibit explained—Art Parsee, left, Colorado School of Mines graduate student in geology, explains an infrared radiometer to two interested visitors. The device used in remote sensing can be adapted to earth-orbiting craft each of you will have an opportunity to meet Dr. Guy T. McBrirde Jr., the new President of the Colorado School of Mines, at that time. 8:30 p.m. Decoration and Donut Open House. It is hoped that the more Alumni possible will come to the Poly, beyond the fraternity and dormitory areas.
BREWED WITH PURE ROCKY MOUNTAIN SPRING WATER.

Technical Societies

Industrial Pollution Seminar Nov. 9-11

L. F. Gowan, marketing director, Environmental Sciences, Inc., Pittsburgh, has announced plans for the first in-depth working seminar on pollution which will be held Nov. 9, 10 and 11 in Pittsburgh.

The seminar, entitled "For Land's Sake," will focus on the pollution and its inherent problems to various manufacturing industries. Prominent speakers familiar with air, water, and land pollution problems and their consequences will discuss legislative trends, codes, air and water sampling techniques, and equipment applications on the information filled agendas.

Essentially, ESI provides land and water surveys, air and water pollution monitoring, identification of pollutants, detailing of specific causes of pollution, establishment of air and water standards within geographic or industrial boundaries, and recommendations for specific anti-pollution equipment and solid waste treatment, analysis and correction.

ESI becomes involved in research and development to a large degree. An analytical laboratory, state certified, and staffed with environmental technological hardware, it is staffed with some of the most prominent engineers and scientists in the country.

Mr. Gowan emphasized, "This is not a 'How To' seminar. Rather, our speakers and audiences will discuss, in detail, industrial emissions in air and water, particulate matter, its causes and effects of SO2, sludge problems, thermal pollution and its effects, plant site selection, and the economics of pollution control. Since we are not an equipment manufacturer, the seminar will remain objective in the analysis of equipment application to specific problems. By the way, we are looking forward to a spirited discussion on solid wastes disposal and its treatment which we plan to feature in more than one community today."

The seminar three-day fee is $200 and reservations are limited.

AMC Convention Session Outlines Impact of Mining Activities on Environment

Ladies attending the American Mining Congress' 1970 Mining Convention in Denver Sept. 27-29, heard firsthand reports from experts on how the growing public concern for the environment affects themselves, their families, and the mining industry. And one of the experts was a woman.

J. Allen Overton, Jr., AMC executive vice president, said the "innovative" session for the ladies was included in the convention program "to portray the mining industry's own deep concern for the environment in meaningful terms."

Lawrence Rigg, III, of New York, president and chief executive of St. Joe Minerals Corp., presided over the speakers in which Dr. J. D. Forrester, of Tucson, Ariz., director of the Division of Environmental Engineering and Research, Phelps Dodge Corp., discussed future mineral needs in relation to supplies and ecological considerations. Forrester was dean of the College of Mines at the University of Arizona and director of the Arizona Bureau of Mines until last July when he was named to head the new Phelps Dodge mining laboratory.

Representing the district was Dr. Beatrice E. Willard of Schooler, Col., executive director of the Thoreau Ecological Foundation, who discussed the conditions under which the mining industry will be operating in the future. A 1947 graduate of Stanford University, she received advanced degrees in botany from the University of Colorado. Dr. Willard has been an environmental consultant to the Omaha District of the U.S. Army Corps of Engineers, the Rocky Mountain Center on Environment, and the White Clouds project of American Smelting and Refining Co. A noted writer and lecturer, she was honored in 1969 by the Colorado Wildlife Federation as the state's Conservationist of the Year.

Discussing the impact of mining activities on air and water quality was Ian K. MacGregor of New York, chairman and chief executive officer of American Metal Climax, Inc. Born and educated in Scotland, he holds degrees in metallurgy from Univ. of Glasgow and Univ. of Strathclyde.

Mrs. Robert B. Speak of Denver, wife of the chairman of the board of Missi and Smotherman Co., and chairman of the AMC ladies program, said this effort on the part of the Mining Congress was most worthwhile because it afforded her an opportunity to learn in understandable terms just what the men of the mining industry are doing to protect the environment while they produce the raw materials all of us need. Mrs. Speak said this is part of a "broadening public involvement in environmental matters."

Mining Executive Named Bible Week Chairman

H. Stuart Harrison, president of Cleveland-Cliffs Iron Co., Cleveland, Ohio, has been named a chairman of industry for National Bible Week. Harrison is active in a number of social, civic and educational agencies in Cleveland, including the Businessmen's Interdepartmental Committee, Cleveland Center on Alcoholism, Cleveland Play House, the National Conference of Christians and Jews, University of Cincinnati and the National Alliance of Businessmen.

He holds membership in several corporations in seven other corporations, and is a leader in the iron, steel, and mining professional organizations.

Cement Expert Speaker

At TIC Symposium

William G. Hime, manager of the chemical and petrographic research section of the Portland Cement Assn., will be the keynote speaker during a symposium on the inorganic applications of automated analysis at the Technicon International Congress in New York City, Nov. 2-4.

The largest meeting of its kind, the Technicon International Congress is composed of 10 symposia dealing with the most recent advances in automated analysis in clinical and industrial laboratories. Papers will be presented.

Mr. Hime will discuss the new role being played by automation in the inorganic industries. The results of a six month evaluation of Technicon's CSM-6 system for cement analysis will also be presented.

The keynote speaker at Technicon International Congress in 1964, Dr. Hime graduated from Heidelberg College in 1948. He joined the Portland Cement Assn. in 1953. In 1959 he received a certificate in philosophy from Northwestern University, retroactive to 1953.

From 1954 to 1955, Mr. Hime was associate professor of chemistry at Louisiana Tech. He has published numerous papers dealing with X-ray, infrared, atomic absorption, and other techniques for cement analysis. Papers will be presented at the Congress by leading research scientists in each field.

Now in its fifth year, the Technicon International Congress has attracted thousands of scientists and researchers from around the world. In addition to the presentation of papers, the Congress will include demonstrations of the most advanced techniques of chemical analysis and exhibits of the newest equipment in the field of automated analysis. The Congress will be held at the New York Hilton Hotel. For additional information about registration, write to Technicon Corporation, Tarrytown, N.Y. 10591.

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New York Hilton Hotel. For additional information about registration, write to Technicon Corporation, Tarrytown, N.Y. 10591.
Executive Secretary

W. W. Forte

Election of Officers. Another year is ending, and it is time to mail out the 1971 Ballot. The Nominating Committee made their recommendations and they were accepted by the Board of Directors. The new slate of officers to be voted on are:

1971 Officers
For President—Harrison L. Hay, 1931
For Vice-President—Neal Harr, 1954
For Secretary—Vote for one
Robert W. Dalton, 1938
Arthur G. Wood, 1941
For Treasurer—Robert Magne, 1947
For Director—CSM Alumni—Term 3 years—Vote for one
Arthur T. Boldie, 1961
David B. Cole, 1952
Thomas E. Young, 1952
For Director—CSM Foundation—Term 2 years
Harold W. Addington, 1940

The Nominating Committee recommended that the same plan be followed as during the past several years—nominating only a single candidate for each office where experience is paramount. Thus, the Secretary for 1971 has been nominated for vice-president, and the vice-president for 1970 has been nominated for the office of president. Three fine Mineers have been nominated for Secretary, and unless the Board changes the plan for 1972, then the winner will be nominated for vice-president in 1972.

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Wrong Caption
We apologize for not having noticed that the printer placed the wrong caption under the picture on page 42, September 1970 issue of MINE Magazine. The caption should have read:

"Dow Gives Mines Electron Microscope.—Robert Fischler, physical research metallurgist, the Dow Chemical Co., left, and Dr. Paul Haid, head of the Colorado School of Mines Metallurgy Dept., are shown dismantling additional units for the electron microscope recently given to mines by Dow. The instrument will be used by Mines students and researchers for determining structure of metals. The gift is part of Dow's M.I.T. university service program."

Advertisers' Listings

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