NEW DUSTLESS STOPER. Light weight, short-leg design with built-in suction and pressure discharge of cuttings. Ideal for clean, low-cost roof bolting.

SEND FOR BULLETIN NO. 4132

A CONSTANT STANDARD OF QUALITY
in everything you need for drilling rock

Branch offices in major cities, home office, 11 Broadway, New York City

DRILLMASTER. The most versatile and productive blast-hole drilling unit ever developed—completely self-powered and self-propelled.

SEND FOR BULLETIN NO. 4179

UNIVERSAL JACKDRILL
The easiest-handling one-man universal drilling unit obtainable; converts quickly to Stopper or Jackhammer drill.

SEND FOR BULLETIN NO. 4144

CARSET BITS AND SHOP EQUIPMENT
...a complete line of Carset Bits, bit and rod shop equipment.

SEND FOR BULLETIN NO. 4146, 4147

CLASS NOTES

When advising us of a change of address, please confirm your position or title and company affiliation. Give your home address as well and indicate which we should use for our mail to you.

1902-1910

Among our oldest graduates are: GILBERT R. JEWEL, '91; JAMES P. PARKER, '91; W. J. ATKINSON, '92; FRED M. STROUD, '92; ROBERT VEST, '93; CLARENCE W. WARNECKE, '94, and H. W. STRYKER, '94. All are listed as address unknown; if you can, help us to locate them or determine whether or not they are still alive.

GEORGE W. NICOLSON, '00, has moved from Pasco, Wash., to 2294 Adams St., Lemon Grove, Calif.

ARTHUR C. TERRY, SR., '05, for many years a consulting engineer in Henderson, Nevada, has moved to 211 Casino Lane, Las Vegas, Nevada. We regret listing you as "address unknown" in the 1956 Directory but your mail sent to Henderson came back undelivered.

HUGH R. VAN WAGENEN, '06, whom we have carried as retired and living in California, now reports that he is manager, Caribou Mining Co., which is producing byxyl from the Harding pegmatite mine in town County, N. M. His address is P. O. Box 425, Datil, N. M.

ALBERT T. MERTENS, '12, has retired and is living at 30 S. Franklin St., Wilmington, Del.

FRANK A. DOWDES, '13, has moved from Visalia, Calif., to 1229 S. 8th St., Alhambra, Calif.

LEROY M. OTIS, '14, has changed his address from 1724 Loma Street, La Jolla, Calif., to Box 132, Leo-Francisco Station, Washington 6, D. C.

A. B. BEALL, JR., '15, gives his new mailing address as P. O. Box 247, Gaylord, Mich. He was living in Sioux City, Iowa.

ROGER S. WITTMANN, '16, consulting engineer, Los Angeles Division, U. S. Treasury Department. His mailing address is 4921 Rupert Lane, La Canada, Calif.

ETHELBERT DOWDEN, '20, has retired, having left Lima, Peru on Aug. 24.

CHARLES A. ROGERS, '23, has moved from Denver to Marysville, Wash., where his new mailing address is Route 1, Box 40, Marysville, Wash.

FRANK A. DOWNES, '26, has moved from Pasadena, Calif., to 8298 Adams St., Lemon Grove, Calif.

LEROY M. OTIS, '26, has moved from Denver to Marysville, Wash., where his new mailing address is Box 1, Box 40, Marysville, Wash.

WALTER MAYER, '22, writes that his mailing address is 215 Goran Lane, Las Vegas, Nevada. (We have carried you as retired and living in California now reports that he is manager, Caribou Mining Co., which is producing byxyl from the Harding pegmatite mine in town County, N. M. His address is P. O. Box 425, Datil, N. M.

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The tough ones come to Card

Card Automatic Bottom Dump Skips
Serve U. S. Producers in most Major Mining Areas

This is a progress report on a relatively new idea. Beginning in 1956, increasing demand for the new Card automatic bottom dump skips has gradually brought them into service in a majority of the nation's principal mining areas—from Arizona to the Canadian line. In a typical operation two of these Card skids of approximately 150 cu. ft. capacity each are used to haul ore up a thousand-foot three-compartment shaft at a rate in excess of 900 tons per day.

In the initial year of operation, in one such installation, these automatic skids carried over 270,000 tons of rock before needing attention other than routine maintenance. The same successful design will prove out in your next project. It can be adapted to any capacity and specifications with ease.

Tell us your requirements.

C. S. Card Iron Works Co.
2101 WEST TEAN AVE., DENVER, COLORADO

(Continued on page 8)
NEW DUSTLESS STOPER.

Light-weight, short-leg design with built-in suction and pressure discharge of cuttings, ideal for clean, low-cost roof bolting. 

SEND FOR BULLETIN NO. 4760

UNIVERSAL JACKDRILL

The easiest-handling one-man universal drilling unit obtainable converts quickly to Stoper or Jackhammer drill.

SEND FOR BULLETIN NO. 4764

CARSET BITS AND SHOP EQUIPMENT

... a complete line of Carset Bits, bit and rod shop equipment.

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DRILLMASTER. The most versatile and productive blast-hole drilling unit ever developed—completely self-powered and self-propelled.

A CONSTANT STANDARD OF QUALITY

in everything you need for drilling rock

Ingersoll-Rand
Branch offices in major cities, home office, 11 Broadway, New York City

CLASS NOTES

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1882-1930

Among our oldest graduates are: GILBERT H. JEWEL, '97, JAMES H. PARKER, '97, W. J. ATKINSON, '97, P. A. DAVIS, '97, ROBERT NEE, '97, CARL W. WARNECKE, '97, FRED JONES, '97, and CHAS. H. STEVENS, '98. All are listed as address unknown—if you can help us to locate them or determine whether or not they are still alive.

GEORGE W. NICHOLSON, '97, has moved from Pasadena, Calif., to 820 Adams St., Loma Vista, Calif.

ARTHUR C. TERRELL, '88, '93, for many years a consulting engineer in Henderson, Nevada, has now moved to 714 Carson St., Las Vegas, Nevada. (We regret listing you as "address unknown" in the 1960 Directory but you will find in Henderson you came back unclaimed.)

HIGH V. VAN WAGENEN, '96, whom we have carried as retired and living in California, now reports that he is manager, Cordillera Mining Co., which is operating here from the Hardinge pegmatite mine in Tonto County, N. M. His address is P. O. Box 397, Dixon, N. M.

ALBERT T. MEFFERS, '12, has retired and is living at 903 N. Franklin St., Wilmington, Del.

FRANK A. DOWNES, '13, has moved from Vista, Calif., to 1829 S. 34th St., Alhambra, Calif.

LEROY M. OTIS, '14, has changed his address from McCloud, Calif., to Box 796, Rose Franklin Station, Washington, D. C.

A. B. BEALL, JR., '15, has moved his mail address to P. O. Box 749, Glencoe, Ind. He was living in South City, Iowa.

ROGER F. WHITE, '18, is senior engineer, Los Angeles Division, U. S. Treasury Department. His mailing address is 4921 Robert Lane, La Canada, Calif.

ETHILBERT DOWDEN, '20, has retired, having left Lima, Peru on Aug. 24.

WALTER MAYER, '22, writes that his new address is 2163 S. High St., Denver 10, Colorado.

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In the initial year of operation, in one such installation, these automatic skips carried over 270,000 tons of rock before needing attention other than routine maintenance. The same successful design will prove out in your next project. It can be adapted to any capacity and specifications with ease.

Tell us your requirements.

The Mines Magazine • October, 1960
American Metal Climax Spends $3 Million on Potash Deposit

Nearly $3,000,000 will be spent by American Metal Climax, Inc. to expand facilities of Southwest Potash Corp. in Carlsbad, N. M., Frank Coolbaugh, '33, president of AMAX, announced recently.

This will be the second expansion step taken by Southwest Potash Corp. since its mine and mill were brought into production late in 1952. The last increase in capacity was made in 1955.

In July the Company announced plans to build a $7,000,000 plant in Vidalia, Miss., to produce nitrate of potash with chlorine as a co-product. The plant is scheduled to come into production in October 1961.

U. S. Silver Production Down 9 Per Cent in 1959

U. S. mine production of recoverable silver declined 9 per cent in 1959 to 31.2 million ounces, the Bureau of Mines reported. The 1959 loss marked the third successive annual decline in silver production, dropping the U. S. from second to third place among silver-producing countries, surpassed by Mexico and Canada.

All of the leading silver-producing states except Idaho, recorded lowered production. The four leading states in silver output (Idaho, Arizona, Utah, and Montana) supplied 89 per cent of the total production. Idaho's silver ore production amounted to about 40 per cent of the total; and most of the remainder was recovered from ores mined chiefly for base metals.

Estimated world output of silver declined 6 per cent in 1959 to 225 million ounces, Canada, which recorded a 2 per cent increase, was the only major silver-producing country to record an increase. The U. S. continued to account for nearly half of the total consumption (including coinage) in the free world.

Coal Wastes May Yield Aluminum

North American Coal Corp. of Cleveland, Ohio, is building a one million dollar plant to recover aluminum from coal mine waste material. Henry G. Schmidt, president of North American, the nation's 10th biggest bituminous producer, said that “production of aluminum ore could overshoot our present activities any time. We may even become a primary aluminum producer.”

North American's method of removing silica and clay from shale to produce aluminum sulfate is an acid process. Aluminum sulfate is decomposed to make aluminum oxide—the final step before production of pig aluminum. Schmidt said the new process would be cheaper by a wide margin than the current $40 a ton for imported bauxite ore.

AEC, Susquehanna Sign Uranium Purchase Contract

The Atomic Energy Commission and Susquehanna-Western, Inc., of Denver, Colo., have signed a uranium purchase contract involving the construction and operation by Susquehanna-Western of a uranium ore processing mill in Karnes County, Texas. The mill is estimated to cost about $2,000,000, and will have a rated capacity of approximately 200 tons of ore a day.

The new mill, which is to be situated about 10 miles southwest of Falls City, Texas, will treat uranium-bearing ores from the southeast Texas area. The contract runs to Dec. 31, 1966, and contains provisions which reserve a portion of the mill capacity to provide a market for appropriate quantities of production from independent producers in the area having ore reserves developed prior to Nov. 24, 1958.

Susquehanna-Western, Inc., with offices at 777 Grant St., in Denver, also operates a 500-ton-a-day uranium mill at Riverton, Wyo., and a 400-ton-a-day mill at Edgemont, S. D., the latter under the name of Mines Development, Inc. Allen D. Gray is president of Susquehanna-Western.

Difficulties Encountered With Underwater Pipeline Construction of the natural gas pipeline from Kachemak Bay Beach on the Kenai Peninsula to Anchorage has encountered unique difficulties in the 8 mile submarine section crossing Turnagain arm. An item in the September 1960 MINES BULLETIN, published by the Department of Natural Resources, State of Alaska, reports strong winds, rip tides, abrasive glacial silt and a 20 to 30 foot side differential combine to make this submarine pipe laying one of the most difficult pipeline jobs in the world. As a result of some experiments made with a 20-ton, seven foot high pile, which will cut a submarine trench seven feet deep, tapering from 52 inches wide at the bottom to 32 inches wide at the top, the rate of cutting the trench wall has to be at 30 feet a minute to keep ahead of natural basalt filling caused by water and gravity action.

Model KE-6e Theodolite

Engineered For American Practice

1. A self-centering and repetition instrument . . . horizontal circle graduated in both directions.
2. Leveling head joint system . . . linkage prevents angle errors caused by movement between leveling head and foot plate.
3. Choice of erected* or inverted (Model KE-6e) image.
4. Optical plummet built into alidade . . . affords a complete check of accuracy when related to HS.
5. Automatic indexing of vertical circle . . . pendulum option eliminates need for vertical central level and assures accurate vertical angles.
6. Control knobs all located on one side, easily selected by touch . . . closely joint system . . . linkage prevents angle errors caused by movement between leveling head and foot plate.
7. Both horizontal and vertical circles are simultaneously used for switching, no modeling one for the other.

For switching, no modeling one for the other.

* Especially useful in mining operations.

Also available: Model KE-1 (inverted), and KE-1e (erected), reading direct to 20 sec, and Model KE-2 (inverted), and KE-2e (erected), reading direct to 1 sec.

KEuffel & Esser Co. Theodolites are designed and built for K&E by world-famous Askania-Werke of Germany. For further information, contact your K&E Dealer, or fill out and mail the coupon below.

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You get the advantages of wise years of field, operating, design and laboratory experience. You gain by our first-hand contact with successful mills all over the world. We have the advantage of many years of field, operating, designing or expanding your mill, with or without an associated machinery company or plant.

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Congratulations to MINES MAGAZINE On Your 10th Anniversary

Metcalf-Evans Egers Machinery Co.
3760 Blake St. Denver, Colo.
You get these ADVANTAGES with CF&I MINING PRODUCTS

CF&I offers the mining industry a wide range of steel products designed to help increase output while maintaining safe operations. This combination of economy and safety is another of the implications of the Image of CF&I.

CF&I Mining Products are fabricated from steels produced in CF&I's own mills. Every product is tested, controlled and inspected during each successive step of manufacture to meet and exceed the highest standards of the mining industry. In actual operation, each CF&I Mining Product provides the following advantages.

**CF&I GRINDING RODS:** Hot-rolled and machine-straightened from special analysis steels. In 1/4" to 4" diameters (in 1/4" increments) and any length required.

**ADVANTAGES:**
- Maximum resistance to abrasion and bending.
- Extra-long service life.

**CF&I MINING PRODUCTS:**

- **CF&I ROCK BOLTS AND REALOCK METALLIC FABRIC:** Rock bolts with Molybdenum steel (left or right hand threaded). Available in 4", 6" and 8" sizes. From 24" to 120" long, in 1" and 2" sizes. Use with Realock Metallic Fabric.
  - **ADVANTAGES:** Achieves safe, economical, permanent ground support.

- **CF&I MINE RAIL AND FASTENINGS:** Rails available in weights from 12 to 45 pounds per yard. Fastenings include splice bars, angle bars, spikes, track bolts and nuts (square and hexagonal).
  - **ADVANTAGES:** Rail suited to your individual requirements.

- **CF&I SPACE SCREENS:** Your choice of metals, weaves, meshes and edge arrangements. For maximum volume or absolute screening accuracy, there's a CF&I Space Screen available.
  - **ADVANTAGES:** Space Screens that exceed your most exacting requirements.

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  - **ADVANTAGES:** Space Screens that exceed your most exacting requirements.

- **CF&I WICKWIRE WIRE ROPE:** Available in all sizes, constructions and grades for every mining application. A new Wickwire development—Double Gray®-X rope—has extra-high strength. In addition, a new wire drawing process employing molybdenum* builds a permanent molecular protective shield around every wire. This rope, known as Wickwire Double Gray®-X, gives you a permanent molecular protective shield around every wire in Double Gray®-X, giving this rope a longer service life.
  - **ADVANTAGES:** Wire ropes that make no bargain with safety.

*Registered Trademark of Climax Molybdenum Co.

For complete information on any CF&I Mining Product, contact your local CF&I sales office, or write for catalogs.

THE COLORADO FUEL AND IRON CORPORATION

In the West:
- THE COLORADO FUEL AND IRON CORPORATION — Albuquerque • Aurora • Aurora • Boise • Buhl • Butte • Denver
- El Paso • Ft. Worth • Houston • Kemmer City • Seattle • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo
- Salt Lake City • San Bernardino • Salt Lake City • Seattle • Spokane • Wichita

In the East:
- WICKWIRE SPENCER STEEL DIVISION — Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans
- New York • Philadelphia
- CF&I OFFICE IN CANADA: Montreal

THE MINES MAGAZINE • OCTOBER, 1960
CLASS NOTES

... (Continued from page 3)

COU., GREEN J. ALLEN, '79, lives at 6114 Sturtevant, El Paso, Texas.

CLIFFORD F. SIMMONS, '79, is a professor at Harvard University with mailing address 13 Geological Museum, Oxford St., Cambridge, Mass.

Other Alumni for whom we have no recent record are: KARL D. ANDREWS, '24, 1113 Holloway St., Austin, Texas. L. C. INGHAM, '22, 18 Telephone Ave., Fort Dodge, Iowa. W. S. HENTRY, '22, Frank W. HENRY, '23, 1516 Chicago Ave., Chicago, Ill. HENRY L. TONGER, '30, 1434 N. Third St., Denver, Colo.

If you know anything about these graduates please let us know.

1931-40

ALBERT V. QUINN, '34, who was promoted to Assistant to the vice president, Mining Division, Link Construction & Mining Co., San Francisco, is now living at 253 Fremont Avenue, San Carlos, Calif.

JOHN F. WALTERS, '31, may be addressed at Hopkins Hospital, U. S. Army Hospital, Fort Ord, Calif.

PHILIP R. ASLIE, '34, Project manager for Stream-Rogerco Mfg. co., now lives at 4215 Yarrow Ct., Wheat Ridge, Colo.

JOHN J. SHOEMAKER, '34, is service manager for United States Steel Corp., with address 400 N. Manor Lane, Fort Worth, Texas.

Earl R. BRISCOE, '37, address unknown.

DAVID P. SYLVESTER, '38, is living at 2227 Polar Bank Ave., S. W., Atlanta, Ga.

WILLIAM H. EVANS, '38, is project engineer for Popular Engineering & Manufacturing Co., division of The Fuller Co. His address is 704 N. 7th St., Emmaus, Pa.

JAMES L. MORRIS, '38, receives mail c/o Lane Oil Co., Box 239, Houston, Texas.

CHARLES H. THIBEAU, '39, is an engineer for American Lumber Dept., Pan Am Atlas Corp., with mailing address P. O. Box 12122, Houston, Texas. He lives at 1215 Lyndale Dr., Houston, Texas.

J. BYRON JONES, '39, has moved from Newport, R. I., to 5 Sherwood Rd., Middletown, R. I.

CLARK M. PRICE, '39, Engi- neering Sales, Project Development for Kipper Screen Co., has recently become an Associate member. Clark lives at 12240 Quillen Ave., Pembroke Pines, Fla. (Welcome! We are glad to have you with us, WFP.)

ROBERT W. KNAFF, '40, has been transferred from Pittsburgh to Massena, N. Y., where his P. O. Box is 264.

W. K. MCGOLDRICK, '41, is living at 2171 21st Ave., Middletown, R. I.

JOSEPH L. OBERR, '40—address unknown.

JOSEPH A. RICH '40—address unknown.

HENRY SCHOLLHORN III '40—address unknown.

R. A. TRENTHAM '40—address unknown.

1941-45

HOWARD C. PARKER, '41, may be addressed at 31 R. D. #4, Moundsville Rd., North East, Pa.

(Continued on page 10)

THE MINES MAGAZINE • OCTOBER, 1960
CLASS NOTES (Continued from page 8)

R. LES SCOTT, '42, manager, Mining Sales, CF&I Corp., has bought a new home at 7043 S. Federal Way, Lakewood, Colo.

ELIE M. MOSZ, '42, is partner, Moss Brothers Securities. His mailing address is Box 44B, Homer, Alaska.

CLIFFORD R. HORN, '49, is assistant to the vice president and manager, petroleum engineering, Panhandle Eastern Pipe Line Co. His address is Box 211, Fort Worth, Texas.

DAVID D. ROBINSON, '49, whose summer explorations in Alaska are nearing completion, will return to his home in Golden about October 10th.

ROBERT H. FITCH is geologist for Texas Zinc Minerals, with mailing address from Barcelona, Venezuela, to P.O. Box 241, Burns, Libby, Idaho, North Africa.

L. R. MEDARIS, '49, has changed his mailing address from Santa Paula, Calif., to 7437 Toronto, Buena Park, Calif.

HEINZ P. FISCHERLING, III, '50, has been transferred from eastern mill superintendent, 8 & 9's, pool, Emerald, to Charcas Unit, San Luis Potosi, Mexico.

JOHN J. BARNETT, '50, senior metallurgist for Tidewater Oil Co. His mailing address is P.O. Box 182, Craig, Colo.

GARY A. BROWN, '50, geologist for The Hayes Corp., has moved from Des Moines, Iowa, to 4637 North 30th Pl., Phoenix, Ariz.

CHARLES D. HOYT, formerly of Colorado School of Mines, is general foreman, Temper Mills, Inland Steel Co., East Chicago, Ind.

EDWIN E. HAMMOND, '50, is geologist for Chevron Oil Co. His mailing address is 7107 Tropicana, Las Vegas, Nev.

J. R. MEDARIS, '49, has changed his mailing address from Santa Paula, Calif., to P.O. Box 241, Burns, Libby, Idaho, North Africa.

205 Fort Worth National Bank Bldg.

CATTLE GROWERS
312 Denver U.S. National Center Denver, Colorado

Lloyd W. Madden, '41

McELROY RANCH COMPANY
OIL OPERATORS CATTLE GROWERS
405 Fort Worth National Bank Bldg.
Fort Worth 2, Texas

P. O. Box 392
Brookside, Texas

Lloyd W. Madden, '41

MENGE RANCH COMPANY
OIL OPERATORS CATTLE GROWERS
703 Wilcox Bldg.
Midland, Texas

Edward J. Brook, '31

EDWARD J. BROOK, '23—address unknown.

LLOYD W. MADDEN, '41—address unknown.

205 Fort Worth National Bank Bldg.

CATTLE GROWERS
312 Denver U.S. National Center
Denver, Colorado

Lloyd W. Madden, '41

SUPER DUTY IS DIAGONAL NO. 6 CONCENTRATOR TABLE

Golden Years Develop the Optimum in Concentrating Tables

The use of a diagonal type concentrator table has been increasing in recent years. The table, which is manufactured by the Deister Concentrator Co. of Chicago, Ill., has proved to be one of the most efficient types in the industry. It has a unique design that permits the froth to travel over the top of the slotted table, which is known as the Deister Concentrator Table. This table is used for the recovery of gold, silver, copper, lead, zinc, and other metals from ores. It is generally used in the mining industry for concentrating precious metals and other valuable minerals. The table is designed to maximize the recovery of fine particles of valuable metals, making it an efficient and economical method for processing ores. The Deister Concentrator Table has become a standard tool in the mining industry, and its use is expected to continue to grow as mining operations expand and new technologies are developed.
Mines Campus Scene of Drilling Blasting Symposium

Tenth Annual Symposium on Drilling and Blasting is being held Oct. 14-19 in the Arthur Libby Library on the campus of the Colorado School of Mines. The symposium is jointly sponsored by the mining departments of the Colorado School of Mines, the University of Minnesota, and the Pennsylvania State University. Reports of the proceedings will be published in a later issue of the Magazine.

Purpose of the symposium is to promote and encourage the dissemination of knowledge concerning production drilling in the mineral and construction industries. The symposium is being attended by mining engineers, drilling and blasting manufacturers and contractors, mine operators and supervisors and all others interested in mineral production and rock removal in construction.

Latest Developments in Basic Oxygen Steelmaking Reviewed

With papers by several world-famous authorities, the "Journal of Metals" has published a comprehensive summary of developments taking place in the basic oxygen steelmaking processes. It is intended by the "Journal of Metals" to make the review an annual process, and a new Canadian bottom-blowing process, such variations as the LD-AC process, and a new Canadian bottom-blowing process.

Because of the rapid strides in these processes, it is important to keep abreast of the latest developments. The magazine, official monthly publication of The Metallurgical Society of The American Institute of Mining, Metallurgical, and Petroleum Engineers, regards the articles, at a time when "a world-wide tidal wave" is "moving these new processes forward," as a highly important portrayal of the adaptation of basic oxygen steelmaking to problems, in many countries, that have been difficult to solve.

The journal reviews the history of the LD process, the place of basic oxygen steelmaking, the physical chemistry of the process, on and off problems, and specific problems, processes, and plants. Included are both the LD and Kall processes, and the "twin-kettle" process, as the LD-AC process, and a new Canadian bottom-blowing process.

The symposium is being attended by mining engineers, drilling and blasting manufacturers and contractors, mine operators and supervisors and all others interested in mineral production and rock removal in construction.

Wyoming Mining Association Selects '61 Convention Site

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FOR EFFICIENT ACTION LIKE THIS ON YOUR NEXT SHOT...

WHICH EXPLOSIVE?

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ATLAS PELLETS, a new form of ammonium nitrate, have both the density and sensitivity required for efficient ammonium nitrate blasting.

MANASTER® gas delay electric blasting caps, most uniform timing in the field because of Atlas electric match and delay compound.

GIANT GELATINS for high velocity shattering action. They are advantageous for extreme oil-well work and for hard, tight shooting.

ROCKMASTER® electric blasting caps achieve the staggered action so important in producing better breakage and control.

ATLAS EXPLOSIVES
Robert S.
Stockton
Teacher,
Engineer and
Rancher
Passes Away

Robert S. Stockton, an 1895 mining engineering graduate of the Colorado School of Mines, died Aug. 5 at his home in Spokane, Wash. In 1909 he received the School’s Distinguished Achievement Award, the equivalent of an honorary doctor of engineering degree. He was a life member of the Colorado School of Mines Alumni Association.

As he grew older, his interests in his alma mater increased and he became a tireless correspondent, reporting on conditions when he was a young man and student. This did not suffice to absorb his energy and he wrote and talked on economics and politics. His utterances were not particularly popular although they taught many of the fundamental truths of the American Way. That our present day civilization has a way of disregarding. He was staunch in his beliefs and a credit to the era that produced and shaped him.

Graduating in the spring of 1895, he and the other members of his class saw the need for an Alumni Association and founded the organization. The first annual banquet was held on June 7, 1895, at the Windsor Hotel. The annual banquet was continued under Mr. Stockton for the next eight years. He was secretary of the fledgling association and served a two-year term as president. The Windsor Hotel has gone, but the tradition of the annual banquet on the evening preceding graduation continues at Mines.

In telling about the early organization, Mr. Stockton wrote that Charles T. Duell was one of the committee that drafted the original constitution and by-laws of the Alumni Association, while George Kennedy of that same class designed the Alumni pin which is still in use.

Born June 5, 1872, in Oquawka, Ill., he grew up as a child in Silvercliff, Colo. In 1889 he worked in the assay office of the Rocky Mountain Smelter in Westcliff, Colo., and in 1891 enrolled at the Colorado School of Mines where he received his E.M. degree four years later. While a student at Mines he took special courses under Dr. Paul Meyer in partial differentials, theory of probability, method of least squares, differential equations, and analytic geometry of three dimensions.

From 1895 to 1903 he taught mathematics and surveying at Mines. On June 25, 1902, Mr. Stockton married Miss Josephine Davidson in Golden, Colo.

In 1903 Mr. Stockton joined the U. S. Reclamation Bureau and served in the following capacities: engineer in charge of the White River Project Survey, 1903-04; engineer in charge of the Lower Yellowstone Project, 1909-10.

From 1911 to 1935 he was superintendent of operations and maintenance for the Canadian Pacific Railroad and was consulting engineer of irrigation and land development for the Department of Natural Resources of Strathmore, Alberta, Canada. In 1909 he received the School’s Distinguished Achievement Award.

If was after his retirement in 1935 that Hercol is manufactured in the smaller diameters, with Class 1 fumes, and high cartridge count—plus its low cost—have already been proved to the economy-minded quarry and open-pit operator.

Now that Hercol is manufactured in the smaller diameters, with Class 1 fumes, some economies are available to the under-ground operator.

Contact the Hercules sales office nearest you or ask your Hercules representative for more detailed information on how Hercol can reduce blasting costs for you, too.

HERCULES POWDER COMPANY

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THE MINES MAGAZINE • OCTOBER, 1960

Properties of Hercol

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<tr>
<th>Fumes</th>
<th>Hercol A</th>
<th>Hercol B</th>
<th>Hercol C</th>
<th>Hercol D</th>
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<td>Water resistance</td>
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A special grade of Hercol is formulated for seismic "pat-tern shooting" when the drill-holes are relatively dry.
Special Cabin for Bathyscaph

The cabin of the bathyscaph "Tri-cote," which recently set a world's record by descending almost seven miles below the ocean's surface, is made of a high-strength nickel-chromium-molybdenum steel three and a half inches thick to protect it from the crushing effect of underwater pressures.

Possession of Melted Gold Illegal in United States

Treasury officials disagree with a published report that it is illegal to arrest a person for having melted gold in his possession. According to an item in the August 1960 Mines Bulletin, the assistant director of Mines Bulletin, in his possession. According to an item in the August 1960 Mines Bulletin, the assistant director of States and Minerals, the assistant director of the Mint conceded there are no criminal penalties in the Gold Reserve Act of 1934. Under this act the civil penalty is confiscation of the gold plus twice its value.

Gold regulations are also backed up by the Trading With the Enemy Act of 1917, which has criminal penalties up to 10 years imprisonment and $10,000 fine. In addition, there are criminal penalties for conspiracy and import and export of gold. The constitutionality of both the Gold Reserve Act of 1934 and the Trading With the Enemy Act of 1917 has been upheld by the Supreme Court. Treasury attorneys concede the 1917 act is applicable only in a period of national emergency by the President. There has been a continuous series of emergency proclamations since 1933.

Figure 1. Gold production in the United States, 1905-58. (Bureau of Mines Minerals Yearbook 1958). For violations of customs laws in the import and export of gold.

The Bulletin points out that possession of newly-minted gold in its natural state is not illegal. But its processing by melting or treatment with chemicals or other means, except under Treasury license, is forbidden. The constitutionality of both the Gold Reserve Act of 1934 and the Trading With the Enemy Act of 1917 has been upheld by the Supreme Court. Treasury attorneys concede the 1917 act is applicable only in a period of national emergency by the President. There has been a continuous series of emergency proclamations since 1933.
Faculty Conference Reviews

**Mineral Needs, Resources**

Dr. Charles J. Christensen, coordinator of research, University of Utah; Prof. John J. Parkinson, head, Department of Mining Engineering, University of Utah; Prof. M. H. "Bud" Robineau, head, Department of Mining Engineering, Colorado School of Mines; Prof. Lute Fletcher; Picnic, Ed Ferrell; Recording, Hilmar Kuhn, Harold Bloom, Charles O. Frank, H. Gordon Pote, Richard V. Hughes and Carl G. Nortquist.

Meetings of the Student Chapter of AIME were held at the University of Utah.

**Zirconium Fabricators Discuss Alloys for Reactors**

"Zirconium fabricators must help the nuclear industry develop less expensive, higher quality zirconium alloys if they hope to take advantage of the great potential business in the nuclear reactor field."

The following desired characteristics for a suitable zirconium alloy to be used in boiling water reactors were listed by General Electric for the zirconium supplier:

1. Corrosion resistance equal to or better than 304 stainless steel at 1,200 F.
2. Strength equal to or better than 304 stainless steel at 1,200 F.
3. Resistance to rapid failure with decreased effects.
4. Strength equal to or better than 304 stainless steel at 1,200 F.

(Continued on page 22)
TECHNICAL SOCIETIES

(Continued from page 20)

R. R. McNaughton of Canada
Elected AIME President for '61

The 36,000-member American Institute of Mining, Metallurgical, and Petroleum Engineers has elected Ronald R. McNaughton, of Trail, British Columbia, as president for 1961. Mr. McNaughton, who will take office on Feb. 25, 1961, is the Institute's 42nd president. Dr. Joseph L. Gillson, of Wilton, N. Y., for Polytechnic Institute of Brooklyn's new Graduate Center, Long Island's first graduate school of engineering, will become the AIME president-elect in February, following Mr. McNaughton's term.

Brooklyn Polytechnic
Inaugurates Graduate Engineering School

Ground was broken recently at Farmingdale, N. Y., for Polytechnic Institute of Brooklyn's new Graduate Center, Long Island's first graduate school of engineering. The facility, with attendant research laboratories, is being established at a cost of $1,600,000 on 25 acres of land leased on Route 110, a half mile east of the Nassau-Suffolk border. Located in Polytechnic by Republic Aviation Corp., the site was formerly part of Republic's Farmingdale property.

In the main building will be twelve laboratories for research in aerospace engineering, electrical engineering, physics and electronic physics. The main building will contain 15,000 square feet of floor space.

The second building will be a steel frame structure of 25,000 square feet, housing three laboratories for basic research in aerodynamics and high power electronics. It will be served with electricity and expandable in all four directions.

Study will be required to graduate work leading toward the master's and doctor's degrees in full-time and part-time, day and evening sessions. Courses will be offered by the departments of aerospace engineering, electrical engineering, mechanical engineering, mathematics and physics.

In addition, new master's and doctor's curricula in electronics, combining the most recent work in physics, electronic engineering, mathematics and mechanics, have been approved by the faculty and will be offered at Farmingdale by Polytechnic's Microwave Research Institute.

American Society for Metals
Dedicates Headquarters

American Society for Metals has dedicated its ground-defined national headquarters in Grove City, Ohio, next Cleveland, with several hundred important lenders from industry, government and scientific agencies in attendance.

Highlights of the event on Sept. 14 were dedicatory addresses by Dr. Clyde Williams and Dr. Zay Jeffries, and placement of a time capsule containing nearly a pound of uranium metal, Walter Crafts, AIME national secretary, presided throughout the ceremonies, and presented the building to Allen Ray Petersen, managing director, for "increased dissemination of technical information for continuous improving technology in metallurgy and its related fields."

Feature of the dedication ceremonies was a time capsule containing nearly a pound of highly radioactive uranium metal. Many documents, books and other materials of the American Society for Metals for inclusion in possible metal-working of a future era with a running amount of the proceeds made up to 1960. Ernest A. Thoms, editor of Metal Progress, published by the American Society for Metals.

Original of the Federal Power Project was to present the basic elements of economic mobilization and national security.

Metallurgical Society
To Be Held During '61

The Metallurgical society, a constituent organization of the American Institute of Mining, Metallurgical, and Petroleum Engineers, has announced several major events in 1961, to which it will sponsor or in which it will be a participant.

The Third AIME Mechanical Working Conference will be held in Pittsburgh at the Penn-Sheraton Hotel on Jan. 15-20, with "Bar and Shaped Products" as the theme.

The AIME Annual Meeting will be held Feb. 6-7 in the Ambassador and Chase-Park Plaza Hotels, St. Louis. The program will include a cocktail evening of the AIME, and technical sessions covering the entire field. The Metallurgical Society, the Society of Mining Engineers of AIME, and the Society of Petroleum Engineers of AIME.

April 10-12 will feature the 46th National Open Hearth and Blast Furnace Conference and Blast Furnace, Coke Oven and Raw Materials Conference, to be held in the Sheraton-Biltmore Hotel. Important topics will be sponsored by the Iron and Steel Division of the Metallurgical Society.

Mr. Metallurgical Society will be a participant in the AIME Interna-

tional Symposium on Agglomeration, April 10-12 in the Sheraton-Biltmore Hotel, Philadelphia, immediately following the Open Hearth and Blast Furnace Conferences. Many speakers from other countries will be on the program.

The Metallurgical Society will cooperate in sponsoring a National Technical Conference on High-Temperature Materials, April 24-25 in the Pennsylvania Hotel, Cleveland.

The Full Meeting of the Metallurgical Society will be held Mar. 18-20 in the Pan-Pacific Hotel, Oakland, Calif., as part of the 134th National Metal Congress.

The 2nd Electric Furnace Conference will be held Dec. 6-8 in the Pennsylvania Hotel, Pittsburgh. This is an Iron and Steel Division event.

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You may be interested in research and development concerned with atomic energy... nucleonic fuels... synthetic rubber...plastics... fertilizers. Or in processes for improved motor fuels, lubricants and other petroleum products. There are many other career opportunities, too, in geology, geophysics, computer programming, marketing, production and transportation.

Promotion from within. Phillips policy of moving people up all along the line... transferring them from within the organization... provides plenty of room to grow. It creates a favorable climate and incentive for ambitious, competent, young engineers and scientists to become the key men of tomorrow.

Set your sights for world-wide job opportunities.
Holland Mine Operators
Triple Steel Rail Life
By Hot Dip Galvanizing

By hot dip galvanizing rails which are used to carry heavy ore loads, a number of Dutch coal-mine operators are now getting three times the service life previously experienced with uncoated steel rails, reports John L. Kimberley, executive vice president of American Zinc Institute.

"Information from the Stichting Domicilie Vernikken (the Dutch galvanizing trade association) shows that conventional steel rails formerly used in the Dutch mines became corroded and unsafe after two to three years as a result of the constant exposure to water, humidity, and aggressive chemical attack; in coal mines water is frequently high in sulphur content," Kimberley stated. "Since applying a protective zinc coating by hot dip galvanizing, this enterprising group of miners have discovered that the rails can now be relied on for from five to six years of efficient and safe, heavy-duty service," he declared.

The extremely aggressive conditions at the mine depths, generally 2,000 to 2,200 feet down, attack rails heavily, and every year of gain is a significant profit in maintenance costs, notes Kimberley. Since most of the mines contain water at elevated temperatures and have sulphate and sulphide content, unprotected steel rails corrode at an accelerated rate, he said. Downtime losses during replacement can never be recovered, Kimberley pointed out.

Kimberley reported that the Dutch hot dip galvanized rails were coated (Continued on page 26)
Automatic Tracking Theodolite Developed by Arm Engineers

An automatic tracking theodolite to provide a rapid method of extending geodetic control, where line-of-sight between stations cannot be established, has been developed by the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va.

Capable of automatically pointing on stationary targets and of automatically tracking fast moving airborne lights, the new theodolite will be used primarily by small artillery units and by topographic units of the Corps of Engineers.

The automatic tracking theodolite is currently undergoing engineering tests. It is expected to be made available for troop use in 1961.

Nickel-Uranium Alloys May Be Metallic Fuel for Small Nuclear Reactors of Future

A niobium alloy containing 20 weight per cent uranium has shown excellent tensile strength and hardness at temperatures in the 1600 Fahrenheit range. By contrast, present-day metallic fuels swell and are otherwise unserviceable above 1200 F. The marked advantage of the niobium alloy at high temperatures suggests strongly that this alloy will be used as fuel for future compact and gas-cooled reactors, where higher operating temperatures will be necessary. Reactors of this type are likely to find use in portable electrical power generators, space craft propulsion systems, and in ship propulsion systems, where a long-life core and corrosion resistance are prime considerations.

While the niobium alloy will probably never be used as fuel for stationary power reactors, its high-temperature properties will make it attractive for use in any reactor designed for minimum weight and size.

The alloy's prospects for use as a reactor fuel are based upon far more than its high-temperature strength. It has other desirable properties. Battelle research has shown that the niobium alloy has high thermal conductivity—a valuable asset in compact reactors. It also retains fission gases, which are a source of considerable difficulty in operating reactors. The alloy has also demonstrated good corrosion resistance. Apart from its desirable properties, the niobium alloy can be prepared with little or no difficulty by a consumable-electrode arc-melting technique, and it can be readily fabricated by standard techniques, Battelle metallurgists report.

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Gold Forms In Ores

By A. J. WEINIG, ’08

The study of the associations of gold in ores is of such technical and economic importance that no one who has had a bearing on ore identifications and treatments. The gold content of ordinary ores is a very small percentage and the search for its associations is often very tedious. Gold, however, has the habit of segregating into localized high grade spots, a property which causes the spotlessness so often disturbing in sampling operations.

For the initial studies of the gold associations in an ore, polished sections are generally difficult to interpret until one has learned through other means of investigation just where to cut sections in which the gold may be found. Often, too, such sections will reveal complications which are confusing unless a tri-dimensional mental picture can be formed from the section. Usually, a good preliminary step to dissolve generous samples of coarse-grained ore, representing various features as determined by eye, in a such a way that the gold content is left as an insoluble residue. Hydrochloric acid and nitric acid, as well as other solvents, may be used as the nature of the ore suggests. When nitric acid is used, especially in the dissolution of sulfides, it is often advisable to add some silver salt in order to control chlorine which is present in many ores. By inspection of such residues the character and localization of gold aggregates is usually revealed. In addition, it will generally be discovered that the gold occurs as crystalline grains and this thought is to be stressed rather than the common concept that it occurs as grains. The sizes of these growths are studied particularly in reference to what may happen to them in grinding when they are enclosed in the ore matrix. Also careful study should be made of the preponderance of extremely fine sizes which may
not be observed unless dark ground illumination or ultramicroscopic methods are applied.

The forms revealed in gold residues often tend to stimulate the creation of both theory and fantasy because fantastic forms are very often observed. These observations, however, are of material value in the adoption of ore treatments as well as to discover the telltale marks, of the Salter, such as the chips and lumps or filings which are so easily slipped into the tool marks of a placer deposit, and similarly, shapes as in their father's father in the early days of the West. The photograph is reproduced here because it has been observed that they in the generation of engineers in the old black art tools so well known to not be easily seen; x 1/2. This specimen was uncovered in a well-known

In those days no man was well dressed unless there dangled at his side the old Colt Peacemaker showing well defined patches and

The photomicrographs herein reproduced will of course be undertaken with extraordinary precautions. Grains as illustrated in Figures 10 to 16 inclusive are forms of gold grains which, if found in the residues, should be regarded with great suspicion, and resampling of the ore deposit should be undertaken with extraordinary precautions. Grains as illustrated in Figure 20 are normal in a placer deposit, and similarly, shapes as in the specific notations with these illustrations, a brief classification and correlation of the essential features is made.

Figures 1 to 9 are examples of gold residue forms obtained by dissolving away the matrix in ores. Figure 2 illustrates a common type of gold crystalline form aggregate found in the oxidized residuum of a placer area.

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Class I Gold Ores

Figures 2, 4, 6, 7, and 9 are types of gold residue forms found in alluvial areas where such gold crystallized before the interfilling of quartz or other minerals was completed. Observed microscopic sections of such ores are shown in Figures 26 to 28 inclusive. Bladed or chain structures are common and often the gold leaves are curved so that in sections, forms like a hook or question mark are revealed. Obtain structures generally arise because the gold leaves are lens-like, or branching, and sections made across them like the dotted line in Figure 6 cause the chain-like appearance in microscopic slides.

Ores of this type form a large class of important gold ores in which many sub-classes and species are of record. In this class belong all gold ores wherein the crystallization of the gold occurred before the composite closure of the fissure with quartz from later quartz-bearing solution. It is to be mentioned, however, that the sub-classes of this great general class relate to the order and kind of gold deposition in relation to other minerals, such as sulfides. A common association involved is with pyrite. Figures 32 to 34 illustrate associations with pyrite in which acid we find the gold may have deposited before, after, or simultaneously with the pyrite. However, regardless of these specific cases, if the gold was deposited before the final silification of the fissure, the type of gold deposit will be designated as Class I which generally is believed to indicate that the carrier solutions were of an acid nature. Accordingly, in this class of deposits alkaline earth carbonates are rare unless they are of secondary or later origin, or results from localized involvements generally associated with intersecting fractures extending into adjoining country rocks.
Class II Gold Ores

Figures 33 and 34 illustrate the types of gold residues from ores in which the gold was deposited subsequent to the main deposition of quartz in the fissure. In those cases the gold is found as an interfilling between quartz crystals and is therefore later than the quartz. The same type of sub-classes are to be found in ores of this class as in Class I, and in addition, many species are found depending on the degree of resorption of the quartz. In Figures 33 to 37 inclusive are examples of observed micrographic sections of this class of ore. In Figures 33 to 38 very little, if any, resorption of the quartz has occurred and the quartz crystal boundaries are usually sharp and angular. Generally, as shown, the gold in such sections suggests limpid photographs and the characteristic may be impressed upon ores over a considerable area in a mining district. In this class of ores, similar forms are often observed in pyrite and calcite. Figure 36 is a micro-section of Goldfield, Nev., ore. It illustrates the typical "eggs nest" structure wherein the quartz crystals have been rounded by resorption. Figure 37 is a reproduction of a micro-section of Hollinger, Canada, ore wherein resorption of the quartz is much more extended and to a degree that the outlines of the original quartz crystals are wholly obliterated. This is another divisional species of ore.

Ores of Class II are believed to result from solutions that were alkaline and the degree of alkalinity is measured by the degree of quartz resorption. Accordingly, alkaline earth carbonates are common. Thin, as a whole, is of very important gold ore class.

Class III Gold Ores

Figures 38 and 39 illustrate observed micrographic sections of this class of ores which is generally an unfortunate one from the standpoint of the mill man. This type of ore is characterized by extremely fine crystallization of gold in the quartz which generally signifies simultaneous deposition. Figure 38 is an extreme case wherein the gold crystals of near colloidal size are observed by the Tyndall effect by projecting a beam of light into the quartz, and then photographing the reflections from the tiny gold crystals suspended therein. These gold grains are almost immeasurably small and at a practical degree of grinding could possibly expose the individual grains which collectively appear as a section of the Milky Way in the evening sky.

Ores of this class, contrary to the prospectus of many wild-cat promotion schemes, really do reveal their gold only too well on fire assaying and can be best treated successfully by smelting methods, provided the grade is sufficient to justify the costs of mining. From a cyanidation or concentration standpoint, ores of this type must be discounted heavily on their assay values, because much will be lost in milling. Our advance texts on mineralogy reveal only the finest gold grains visible in the ultramicroscope, which collectively appear as a section of the Milky Way in the evening sky.

Ores of Class III are divided into sub-classes (A, B, C). Figures 38 to 41 inclusive are examples of ores of Class III. In the following pages are illustrated typical sections of the various sub-classes of ore. Figure 38 illustrates an almost pure gold association, but still with many fine grains not revealed clearly in the photomicrograph. Ores of this class include some well known difficult ores which will be nameless here. Taken as a whole, this class of ore is commercially unimportant and the nature of the solution depositing...
Class IV Gold Ores (Tellurides)

It is debatable. This type of gold ore is described largely as a warning. The telluric residuum silicifies and migrates to the region of the original crystal axis and there recrystallizes into aggregates. This feature explains the common occurrence of gold adhering to pyrite after crushing free from quartz. This observation is a common one showing that the gold between pyrite and quartz is stronger than that between gold and quartz. It is a fortunate circumstance from the viewpoint of the mill man.

The gold, on the other hand, migrates to the region of the telluride gold ores are generally considered because of rarity, need not be discussed in this brief outline. Also it must be kept in mind that some ores show more than one type of gold association generally related to different stages of mineralization.

The microscopic study of ores in very many cases reveals specific habits and associations which serve as identifications. As an illustration, Figures 48, 49, and 50 are introduced showing characteristics of Rand, South Africa, ore. In Figure 48 the interfilling between adhering quartz pebbles is shown and it is to be noted that the pyrite enclosed in the pebbles is angular in shape and in its original crystal form. However, the pyrite grains in the interfilling are smaller and rounded. Further, these rounded pyrite grains as shown in Figure 49 are frequently crushed, especially where two quartz pebbles make close contact. Also occasionally, as shown in Figure 50, gold may be found interfiling the fractures in the rounded pyritic grains.

It is debated whether these gold ores are generally considered by some writers as a warning. The telluride gold ores are generally considered because of rarity, need not be discussed in this brief outline. Also it must be kept in mind that some ores show more than one type of gold association generally related to different stages of mineralization. The microscopic study of ores in very many cases reveals specific habits and associations which serve as identifications. As an illustration, Figures 48, 49, and 50 are introduced showing characteristics of Rand, South Africa, ore. In Figure 48 the interfilling between adhering quartz pebbles is shown and it is to be noted that the pyrite enclosed in the pebbles is angular in shape and in its original crystal form. However, the pyrite grains in the interfilling are smaller and rounded. Further, these rounded pyrite grains as shown in Figure 49 are frequently crushed, especially where two quartz pebbles make close contact. Also occasionally, as shown in Figure 50, gold may be found interfiling the fractures in the rounded pyritic grains.
The following tabulation shows the rapid increase in gold production during the first few years of the District's productive years:

- The production from the district amounted to $200,000 in 1891, but increased to $2 million for 1893, inclusive.
- The production during the first six years, the production dropped to a low of $13 million in 1903, then rose to $15.7 million in 1904, and continued to rise in dividends during the period from 1893 to 1899 inclusive.

Transportation

The Midland Terminal Railroad connecting the district with Pueblo Smelter was completed December 1895, and the Florence and Cripple Creek Railroad was placed in operation July 2, 1894. The Colorado Springs and Cripple Creek District Railroad was completed into the District in 1901. These transportation facilities resulted in several mills being built and operated in Colorado Springs (Colorado City) and Florence. Mills were also built in the District and at Gillette, which was located just north of Cripple Creek.

Geology

The early geological surveys of the District concluded that the pre-cambrian crystalline complex which forms a general plateau of the region was perforated by a volcanic explosion. Others stated that the mineralized area—a roughly elliptical area approximately 6 miles long by 3 miles wide—occupied the crater of an extinct volcano.

The volcanic theory of its formation prevailed until A. H. Koschmann of the U.S. Geological Survey, made a study of the District in 1934 and 1935 and disclosed evidence that this theory was erroneous. His new and now well substantiated and accepted theory is stated in a paper, "New Light on the Geology of the Cripple Creek District," given at Colorado Mining Association annual meeting in Denver, Colo., Jan. 25, 1941.

Quoting from this as follows, explains his theory: "(1) The main mass of breccia occupies a pit or basin which owes its origin to subsidence along vertical or steeply-dipping faults and is not a product of a violent volcanic eruption; (2) As the basin intermittently subsided, it was gradually filled first with non-volcanic sediment and later with a thick accumulation of volcanic breccia; (3) the basin was a focus of intense igneous activity. However, volcanic veins or knobs from which phanoolite agglomerate could have been violently ejected have not been found and it therefore seems likely that fissure eruptions accounted for the volcanic material which was subsequently eroded and redistributed by running water."
Golden Cycle Corporation President Concerned About U. S. Gold Reserve Situation

Since this issue of The MINES Magazine has stressed the use of gold as a medium of monetary exchange, we feel that it is only proper to include, at least in part, a letter written just recently to the Honorable Robert B. Anderson, secretary of the Treasury, by Mr. Merrill E. Shoup, president, Golden Cycle Corporation, expressing his concern over the continuing loss of U.S. gold reserves.

A part of Mr. Shoup's letter follows:

September 21, 1960

The Honorable Robert B. Anderson
Secretary of the Treasury
Washington, D. C.

Dear Mr. Anderson:

Since 1958 the Nation's gold reserves have shrunk more than $1,000,000,000 and today are below $19,000,000,000, reaching $18,990,202,000 on September 7. Many economists are of the opinion that the world point beyond which our gold reserves cannot further shrink is $18,000,000,000. Last week we lost another $51,000,000 in gold, and no lesser loss can further shrink is $18,000,000,000. Last week that the peril point beyond which our gold reserves cannot further shrink is $18,000,000,000, reaching $18,990,202,000 on September 7, 1960. The United States has become a high-cost producer and gold, for the American public to finance speculations in money management by paying higher taxes, buying even more Government bonds, or enduring more purposeful monetary inflation. Based upon the campaign promises of both Presidential candidates, there is little hope of either curtailing public expenditures or balancing the budget. (1) Maintain world confidence in the United States dollar which necessitates putting our gold reserves on a sound dollar basis, maintaining parity with the British pound and, if foreign financial institution holders agree, with the German mark. The use of gold as a medium of monetary exchange is the logical solution to our problem. (2) The then relatively new flotation process was also used by the District ores, these being the “near surface” oxidized ore, disappeared and more of the gold was contained in the sulfides and tellurides. This condition increased the difficulty in obtaining a satisfactory recovery of the gold values. At this period smelters seemed to be the best solution to the metallurgical problem so the ore was shipped to Pueblo and Denver. (3) Force our allies to take a larger share of our gold reserves. We have used our resources to make it impossible for our allies to stage a powerful economic comeback, and although they are now in a position to take over a larger share of our pledged economic and military aid around the world, there is little immediate likelihood of any substantial progress in this direction.

It, therefore, is clear that it will be impossible in a reasonably short period to work out a part or all of the remedies above set out prior to the time when our gold reserves reach $18,000,000,000.

* * *

I know you are familiar with the gold situation and realize that the Nation faces in its gold problem one of the greatest crises in generations. Your ideas on this all important matter will be greatly appreciated.

Sincerely,

Merrill E. Shoup, President


Town of Goldfield and Independence (near Cripple Creek), 1918.

Golden Cycle will lie in 1967.
The greatest deterrent to mining in the District at present is the unremunerative price of gold compared to the price of all other metals and commodities, the price being $35 per ounce, which is the same as established in 1894. Tonnage of ore treated at present amounts to an average of only 5000-6000 tons per month. Whether or not the Cripple Creek-Victor District will ever again assume a prosperous period depends entirely upon a revision of our national monetary policy with respect to gold reserves and a more realistic price for gold.

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The Role of Gold in International Liquidity

By DR. OSCAR L. ALTMAN

In recent years there has been a great deal of discussion about the role of gold in international liquidity. Some have expressed the fear that the world does not now have enough gold to conduct its international business properly; others have maintained that the world's stock of gold is not increasing fast enough to keep production and trade expanding as rapidly as they should; yet others have expressed the fear that the total amount of gold, dollars, sterling, and other currencies held by all countries—what is generally called international liquidity—is inadequate. It is only natural, therefore, that some future generation might be made to increase the value of the gold held in international reserves or to increase international liquidity in other ways.

World Adopts Gold Standard

The gold standard as we knew it was primarily a development of the latter part of the nineteenth century. Before that, the countries of the world were on a silver standard, or on a standard based on both silver and gold, or on an inconvertible paper standard. The U.S. was on a bimetallic standard from the founding of the Republic until 1873, excluding only the period during and after the Civil War when we had greenbacks—convertible paper money. Since 1873, the U.S. dollar has been defined in terms of gold against deposits and currency. Nevertheless, from 1873 to 1879, when the United States was on the gold standard, gold was shipped from one country to another, and only a small part was financed by movements of gold.

Today, the structure of reserves and of domestic money is very different than it was in 1913, or even that it was at the beginning of the Second World War in 1939. First, practically all of the world's monetary gold has been gathered up into official holdings, where it is used in international transactions instead of in domestic ones. Many countries, moreover, no longer try to regulate the amount of money used domestically with reference to their gold reserves. The United States, however, is the most important country that requires a legal reserve in the form of gold against deposits and currency. Nevertheless, even in the United States this gold reserve requirement has not really limited the amount of domestic money...
money for a great many years. Gold reserves have been so much greater than legal requirements that the United States has been able to manage its monetary policy with respect to other criteria. This has led to suggestions that the statutory gold reserve requirement be reduced or abolished, so that all gold can be used for international transactions.

Second, economic development since the end of World War II, and the increased share of the United States in world trade, have greatly changed the status of the dollar. It has become a much larger proportion of their liquid assets in the form of deposits and a smaller proportion in gold than did the dollar hold at a lower level, than they have been in many years.

At the present time, the United States is alone among the great powers in having a major balance of payments deficit. In 1960 and 1969, this first year deficit totalled $5 billion, and it would be imprudent to minimize the difficulties that may be involved in correcting this deficit. This will take time, particularly if we educate ourselves to corrective measures that in the long run will help us and the international community of nations. But these corrective measures will have to be taken in any case. Our balance of payments deficits were not caused by the dollar itself. Our mistakes, our oversights, are twice that reserves and they cannot be cured by arbitrarily increasing international reserves. Indeed, our balance of payments deficits have greatly improved the reserve position of many other countries, and this will ultimately make possible further expansion of our exports.

We may perhaps agree that the world total of international reserves is not a simple matter of arithmetic, but it should be bathed in the sun of comparison with other currencies. Given the role of the U.S. during and after the war, it was inevitable that the dollar should become the most important world currency, and that it should be held widely by other countries and in increasing quantities, was a tribute to its convertibility, its stability, and its usefulness. But the changed position of the dollar has also created new responsibilities.

I do not share the fears of some students that the world dollar is an accident, that its convertibility to its trading partners is responsible for its growing trade. Properly, reserves of all countries total $6 billion and assets of the International Monetary Fund stand at $14 billion. In my opinion, no convincing case can be made for the view that these amounts are not large enough to enable the world's economic structure to absorb any shock that could arise. Reserves have not prevented the world from growing trade, and then concluding that the supply of money is too large, too small, or just right.

**Adaptability of International Reserves**

The adaptability of international reserves is a much more important question, and there are many totals that can be considered "right." The adaptability of reserves must also be judged in relation to how reserves are distributed, whether or not countries that compete with us for trade, and whether inflations are at work. No amount of reserves will be adequate if the most important countries cannot live within their means. No amount of reserves will be adequate if the United States was the magic country to economic development. Reserves will appear to be inadequate if the exchange rate is strong and severe depressions are permitted to develop.

Fortunately, international trade is in better balances, and the world seems to trade at a lower level, than they have been in many years. In the past few years, the U.S. has sold gold in Western Europe, to pay for imports, at the rate of about $250 million per year. Soviet sales are thus five times as large as U.S. production. Some countries, such as the United States, have reserves at $7 billion or $8 billion; my own view is that they probably fall between 8 billion and 8.5 billion; but there are others who believe that U.S. reserves are at least double these quantities.

It is beyond doubt, however, that the Soviet Union is the second largest producer and holder of gold in the world, and its gold reserves could be the most effective instrument yet devised for preventing a gold windfall from any increase in the price of gold. It is a matter of considerable surprise to me to think that so little is being realized about the extent to which the gold of the U.S., which is now held primarily as an international reserve, could be used. The U.S. holds about $2 billion of currencies of other sovereigns. These currencies were acquired through the sale of surplus property, agricultural surpluses and in other ways; in practically all cases these currencies can be spent only for payments of U.S. Government expenses, loans for development purposes, and stimulation of imports from the United States. The third approach is to continue and develop our present arrangements, under which countries will meet demands upon them by using their own reserves and, if this fails, to obtain reserves borrowed from the International Monetary Fund.

In the field of international finances, the establishment of the Fund under the lend-lease plan represents a continental dividend. Its assets, which were increased to $14 billion last year, consist of gold and holdings of other countries. These resources can be borrowed by members on a short-term basis, usually three to five years. Resources can be drawn upon to meet temporary and permanent emergencies, crop failures, and speculative runs on currencies. With all our gold reserves, the U.S. holds about $2 billion of currencies of other sovereigns. These currencies were acquired through the sale of surplus property, agricultural surpluses and in other ways; in practically all cases these currencies can be spent only for payments of U.S. Government expenses, loans for development purposes, and stimulation of imports from the United States. The third approach is to continue and develop our present arrangements, under which countries will meet demands upon them by using their own reserves and, if this fails, to obtain reserves borrowed from the International Monetary Fund.

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increased substantially, the Fund stand-by has been given up, and half of the money borrowed from the Fund and the United States has been repaid. If this run on sterling had come in 1930 or in 1932, the outcome could have been most serious. A much smaller pressure in 1930, that began in Austria, spread from country to country, leading to the devaluation of one currency after another, not commencing our own dollar in 1934. In 1936 and 1937, the prompt actions of the International Monetary Fund, and the feeling of international monetary cooperation that gave life and strength to the Fund, nipped in the bud what could have been a severe crisis.

Many Nations Use Fund’s Resources
No one can predict when such a speculative crisis may next appear, nor which currency may be affected. All one can say is that a Fund with $14 billion of assets is in a position to do a great deal of good. Many countries have made effective use of the Fund’s resources, including the United Kingdom, France, the Netherlands, India, and Australia. The United States, however, has not had occasion to use the Fund’s resources to meet balance of payments deficits. Indeed, there is considerable question whether it would not be more appropriate for the U.S., with its large gold reserves, to handle its balance of payments deficits with monetary and fiscal policies rather than to finance these deficits by using the resources of the Fund. But if it were wise, if this course of action is the most appropriate, there is no reason to believe that it would be most appropriate under all circumstances and at all times.

To be sure, a country may get along without using the resources of the Fund. Its reserves may be so enormous that it can ride out any storm without borrowing. This was our situation for many years, and it may well be our situation for many more. But the U.S. already has half of the world’s stock of monetary gold; and any attempt to acquire more will simply undo years of effort on our part to liberalize trade, reduce impediments to trade, and encourage the economic development of the non-communist world.

Maintaining International Equilibrium
A country without enormous reserves can maintain its international equilibrium well enough by using monetary and fiscal policies and other appropriate policies, and it may from time to time have to supplement these by making use of the Fund’s resources. If its currency is widely used in international trade, such a country may have additional reasons to use the Fund to deal with speculative runs and movements of hot money. It is also possible for a country without enormous reserves, or even with quite inadequate reserves, to get along without borrowing from the Fund. It can run for a storm shelter every time difficulties appear, and impose tariffs, restrictions, and other barriers to trade. Before we take refuge behind such devices, we may well remember how we feel to get along without borrowing from the Fund.

Our international financial machinery has developed a great deal since the war, and it will continue to develop. A realistic appraisal of present conditions, and of the foreseeable future, shows us problems but not crises; it suggests that we should be concerned about order and to see if the international financial structure we already have rather than to embark on far-reaching measures for which we are not ready.

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THE MINES MAGAZINE • OCTOBER, 1960

Gone Are The Days
By ARTHUR F. MATHIAM

Ever so often some one asks for a history of mining and wants to know what some of the old times were up to in days gone by. It would require a tome to chronicle all the events. Mining operations in the early days were conducted mostly by hand and a few curse words.

Nevadaville, Colo., (now a ghost town near Central City) in its heyday boasted of a population of between five thousand and six thousand. Today nothing much is left but ruins. Although the old jail and the old Masonic Building are still standing, they have been ravaged by vandals. The water ditch, which emanated from the Mountain over the hill from Georgeville, was caved in and groved over with vegetation. Many of the old mining claims have since been picked up by a few prospectors and sold. The ancient machinery, as well as the old buildings, were numerous among some of the cabins until a few years ago. Some of the machinery used at that time was still in place, but lately has been an invitation to vandals.

Several years ago the creek below Blackhawk was placered with heavy machinery operated by Edward Maxson, who recovered considerable gold, quartz, and marble. The buildings that caved in and groved over with vegetation, and some of the mines, among them such famous names as Little Emma, Polar Star, Rogers, Nyonna, Reliance, Silver Dunes, Silver Cloud, and others, were worked by Eastern mining companies. Today the only means of access now is by horse or on foot.

THE AUTHOR

Until the L-608 government edict caused a shutdown of all but a few gold mines, Arthur F. Mathiam employed 18 men at the Reed Creek Mine at Empire, Colo. In addition to being a mine owner, Mathiam writes for three or four newspapers, is a member of the Clear Creek Metal Mining Association, and has been secretary for six years of the Denver Mining Club. He attended Colorado and Northwestern Universities.

THE AUTHOR

By ARTHUR F. MATHIAM

On the north side of Democrat Mountain over the hill from Georgetown, can be seen the remains of 22 dumps rich in lead and silver. These mines, among them such famous

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the late 1920's. Joe Ruth (Joseph P. Ruth, x-21) had a fluctuation in operation which was removed by team and truck some 20 years ago.

Shipments were made by loading on cars at Empire Junction. Some of these properties shipped ore that ran as high as five ounces in gold and 100 ounces in silver. The Bard Creek Mine on Lincoln Mountain opposite Democrat Mountain was also a good producer, with $90,000 being taken out of one stop.

There is a prephry dike about 15 feet wide running through these properties, the eastern side of which runs in gold and the western side heavy in silver. The dike is discernable to the naked eye from a distance.

Old Timers Talk It Over

Many of the old timers who used to attend the meetings and were instrumental in organizing the Denver Mining Club, worked on the Newhouse (now the Argo, a five-mile tunnel running from Idaho Springs through the mountain to Central City), the McClelland, Honest John, Miner, and other mines located on Democrat Mountain or near Nevada-ville, Russell Gulch, Central City and Blackhawk. Others worked in the Ajax, Vindicator and Portland mines in Cripple Creek.

Considerable enthusiasm was manifested among miners to get to these meetings to discuss “finds” and to learn what the other fellows were doing in their territories. Often specimens were exhibited, some rich, others just hunks of ore which at the time were unknown and thought useless. Comparisons of ores sometimes led to heated discussions, but nothing serious happened.

Other reports might cite the overturning of an ore wagon at a high altitude. The wagon usually contained loaded ore, the unknown elements being thrown on the dump. Modern science has since found commercial use in what was supposed to be waste, so that many of the old dumps are now valuable.

Reports were all oral and consisted of progress, shipments and new finds, some rich where a chimney was known to be waste, so that many known elements being thrown on the dump. Modern science has since found commercial use in what was supposed to be waste, so that many of the old dumps are now valuable.

Rags to Riches or Vice Versa

George Collins, Shrive Chase, and John Evans were active in mining and history records that the First National Bank of Denver was founded of an old sawmill and boarding house, the means of his riches and of his downfall. His widow, Baby Doe, died in a tumbled-down cabin on the mountain just hunks of ore which at the time were unknown and thought useless.

Comparisons of ores sometimes led to heated discussions, but nothing serious happened.

Behind the liners was an accumulated quantity of gold, and in cleaning out the ball mill $13,000 in gold was recovered. The systematic breakdown was thus explained, as the owner told the shift boss that the next stoppage would see every man hired. It seemed that at least one liner was cleaned every night—after it came loose, necessitating a shutdown until repairs were made.

After quite a few of these break-downs, the owner told the shift boss to call him on the phone no matter what time of night it happened. One night about 2 a.m. the phone rang. The owner said he would be right over and help with the repairs.

“Heavy work, boss, we'll have it fixed shortly,” the shift boss replied. But the boss went just the same.

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In 1914 The Foss Drug Co. and Washington Ave. (in Golden, Colo.) looked like this. The first car is one of those speedy but "explosive" Stanley Steamers.

The first cabin in Silverton, Colo., was built in 1874 by F. M. Snowden, shown sitting beside the front door.

Springs, Georgetown, and Silver Plume, was both standard and narrow gauge as far as Golden. Further than Golden, it was narrow gauge only. Ore cars were switched and the contents reloaded in standard gauge cars for shipment to smelters. Freight rates varied with the value of the shipment. Silver at the time was $1.29 an ounce and gold $20.67 an ounce.

The old Central City depot of the Colorado & Southern is now covered with tailings from the Glory Hole workings and is hardly discernable. A relic from shipping days is the old engine and cars standing below the old depot, a present to the community by the railroad. Idaho Springs also has an engine, and Silver Plume several freight cars and a caboose. The old depot and pavilion at Silver Plume, where a "Y" was used to turn the engine around, is still in use but for other purposes.

In traveling the Clear Creek Canyon highway, the tourist now sees parts of the old railroad bed but he is unaware of the feet unless an old timer is along to point out and explain the changes that have taken place in the last few years. In the old days, sightseers could reach out of the windows and touch the adjacent rocks at some spots along the rail road. Trains carried open side-seated cars, and the engines—low geared with a long piston stroke for pulling—traveled slowly up the four per cent average grade. Often freight trains were pulled by two or more engines, the train being split at the Forks, where one section would head for Blackhawk and Central City, the other for Georgetown and Silver Plume. Until converted to oil instead of coal, engines were equipped with cinder catchers on top of the smoke stack to prevent forest fires.

Silver Railroad Passes
In connection with the passing of the narrow gauge railroads, it might be well to mention some of the practices of old. Harold Waddington of Silverton is the owner of two passes on the Silverton-Northern Railroad. The passes are made of solid silver, one carrying the date, 1889, and the number, 294; the other dated 1892 and numbered 415. The passes are engraved with the names of C. Tucker and A. E. Walther and are signed by Otto Mears as president of the Denver & Rio Grande Railroad. Both passes were made by Colorado workmen just before and after silver went overboard during Grover Cleveland's administration in the early 1890s.

By coincidence, a Democratic administration put the kibosh on silver, and in the 1930s a Democratic administration put the kibosh on gold. The small miner seems to have been plenty kiboshed and has to pay taxes on properties which according to government restrictions he is unable to operate.

This is the famous Georgetown Loop of the Colorado & Southern Railroad between Georgetown and Silver Plume, Colo.
As the final reporting of the Fifth Annual Alumni Fund Drive is being prepared for presentation, here is a compilation of the gift totals since the First Annual Alumni Fund Drive began in April, 1955.

Gifts from alumni, the keystone of any college financial growth program, total $101,845.43

From individuals of means and through wills and bequests, the Colorado School of Mines Foundation, Inc., has received $405,646.83

Parents have demonstrated their belief in the educational opportunities for their sons at Mines by gifts to the Colorado School of Mines Foundation, Inc., totaling $6,688.77

Funds allocated or spent for faculty improvement — maintaining and improving the high quality of the School's faculty by supporting research, underwriting travel to professional meetings and for prospective faculty members — total $239,600
It is our pleasure to present this information from the forthcoming MINES Memo as part of The MINES Magazine for October, 1960. Usually the MINES Memo is mailed quarterly to every Alumni of the School of Mines as well as to several thousand friends whose interest in this School has been attested by supporting the CSM Foundation Program.

In the past, many opportunities have been created to express interest in the welfare of the Colorado School of Mines. At the turn of the century, alumni who were alumni gifts will be doubled in size automatically.

The final report for the 5th Annual Alumni Development Fund will be ready sometime in the near future. In fact, very few gold mines of the world have ever been able to continually produce as much precious bullion as is being shipped from the famous “Tayoltita” Gold Mines of Durango, Mexico.

The ends of “Tayoltita” gold bullion bars, as may be seen in the picture, appear to be chamfered to the President, and who now direct the activities of the Foundation staff, has plans to pursue a more aggressive effort in each of the fields illustrated.

The most common criticism offered is that our dues are too high. This is a valid charge, and the Alumni Association is committed to the President, and who now direct the activities of the Foundation staff, has plans to pursue a more aggressive effort in each of the fields illustrated.

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was Captain de Ibarra who discovered the gold in the "Tayoltita" area. He further wrote that the engineers believed there was a large deposit of much richer ore than they had encountered in the upper areas. He was humbly built with keen perceiving eyes that saw humor in hardships and danger. His face was covered with hair of a vigorous heard, he cursed with a smile and was always ready with his fists, but with all his rough exterior, his men knew he had a heart of gold. From the beginning until his death, he was affectionately referred to as "the Senator."

Captain Rawlings, for whom the natives worked, gained both the affection and the admiration of his men. He had only a single winding—mountain trail leading down his "hard-rock" superintendent, Captain Rawlings, in whom he had great confidence. Following a careful examination of formations and structure, the Captain pointed out a similarity to a mine he had worked for the Senator and expressed the opinion that there was likely a good ore body below the bottom workings. Between this, the Senator consulted, and with this possibility he ordered the Captain to sink an exploratory shaft through the barren bottom, and that no values were left in the barren bottom and that no values were left in the mine. Senator Hearst elung to his belief in the Church records, in whom he had great confidence. Following a careful examination of formations and structure, the Captain pointed out a similarity to a mine he had worked for the Senator and expressed the opinion that there was likely a good ore body below the bottom workings. Between this, the Senator consulted, and with this possibility he ordered the Captain to sink an exploratory shaft through the barren bottom.

In less than 100 feet of his shaft's depth, the Captain encountered a vast deposit of low grade ore. It assayed only about 7 to 8 grams of gold and between 500 and 600 grams of silver per ton, being a low grade of milling ore. The Captain told the men that the Senator was elated to find his belief in the old Church records was justified and ordered setting up a 50-ton mill to begin operations.

Rich Ore Sweetens Values

As the Captain proceeded downward, he discovered cross-veins of much richer ore than "sweetened" values of his run-of-mine lower grade and made the operation much more profitable. In 1922, Theodore Dickel, a mining engineer of splendid reputation, designed and constructed a new 155-ton mill with a cyanide recovery plant. In 1927, he increased its milling capacity from 50 to 70 tons, and finally in 1938, he enlarged the mill to 775-ton capacity at a present rate of 350 tons per day.

Several years ago they found a bonanza grade of ore, down in the lower sulfides of "Tayoltita" in a contact zone of a series of cross-veins. The vein faces varied in widths from 1 foot to nearly 10 feet wide and carried unbelievably rich ore, assaying 4,000 grams of gold and 4,500 grams of silver per ton, valued at over $6,000 per ton. This is a fabulous value and a reason for establishing "Tayoltita" as a fabulous mine. However, the large mass of run-of-mine ore is still low grade, merely being "sweetened" by the high grade.

Average value per bar is $4,390.

"Tayoltita" mines are owned and operated by the San Luis Mining Co. of Durango, Mexico, and controlled by the William Randolph Hearst interests of San Francisco and New York. Gold and silver bullion is loaded on mules and taken to Tayoltita's airfield for shipment.
The first article in The Mines Magazine, Volume 1, Number 1, published in October of 1910, was an article on the Mines Experimental Plant. Written by Professor F. W. Traphagen of the Metallurgy Department, it was entitled “The New Ore Dressing and Metallurgical Experimental Plant of the Colorado School of Mines,” and was given over to a discussion of the plans for the new Experimental Plant to be completed that year.

Now, half a century later, although the shell of this original building still makes up the largest structure of the plant, it would be difficult for anyone to recognize it as the same operation. Indeed, the old concrete and steel structure of the original “mill” shell is about the only thing that the present-day plant has in common with the 1910 operation.

It has evolved over the years—sometimes slowly and sometimes suddenly—into the present-day Colorado School of Mines Research Foundation; without contest, the best equipped and most capable organization existing for research within the mineral industries, with sponsors scattered all over the world.

Design of Original Plant

The original Experimental Plant, which was called the “Met Plant” for most of its first 30 years, was designed after the processing plants of that time—usually built near their supplying mines on sloping mountainsides. Without sand pumps to move the material from stage to stage, the designers built their plants around a gravity-fed operation, with successive processes taking place on different levels within the mill, until the final product dropped out of the bottom of the building into railroad cars or wagons. Although the Met Plant at Mines was built on level ground, its original design called for the stepped-off, gravity-fed flow sheet, with ore bins tied near the rafter, and a full “life-size” equipment and machinery all the way down to the sloping floor.

The Experimental Plant did little during this first decade by way of developmental work, and its most effective function was as a working classroom and machinery all the way down to the sloping floor.

Reorganization by Alderson

In 1923, Victor C. Alderson during his second term as president, in a move to stimulate the Plant into activity that would be useful to both the School of Mines educational aims and to the mineral industry, set about to reorganize it.

President Alderson, under whose leadership the Plant had been built when he was serving his first term, contacted A. J. Weinig, a 1908 alumnus of Mines who was distinguishing himself in metallurgical consulting, and arranged for him to take over the Plant. Weinig made himself available as a staff expert and paid rental fees to the School for the use of the equipment in his growing consulting practice. S. Power Warren, Class of 15, was appointed by President Alderson as associate director, with the plan that “Pi” would build and maintain a creditable research program that would make full use of the Met Plant for the purposes of educating young Mines metallurgists and graduate students.

Weinig was empowered to dispose of the old machinery and use whatever funds he could derive from them in beginning refurbishing the Plant, and to these meagre replacements he gradually added an array of equipment. Warren continued with the Plant for a few years before he drifted over to the campus into full-time teaching.

Weinig Directs Plant for 26 Years

The A. J. Weinig operation of the Experimental Plant continued for 26 years, up to his retirement in 1949. During his tenure he handled developmental research work for some of the largest companies of the mineral industries, and maintained about 40 clients throughout the period. He built equipment for pilot plant work, set up the prospectors’ clinic, and did extensive developmental work in flotation machinery. During this time nearly all of the staff of the Experimental Plant worked directly for Weinig, who also maintained separate offices and drafting rooms in Denver.

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CSM Research Foundation Incorporated

The year 1949 saw the end of the Mines Experimental Plant and the incorporation of the Colorado School of Mines Research Foundation. Under the leadership of President John W Vanderwilt, a separate, not-for-profit corporation was established under a Board of Trustees which included prominent representatives from the mineral industry with an overlapping of some of the board members of the School of Mines. Vernon L. Mattson, Class of 1926, was appointed to direct the operation, and the Research Foundation was formed with a Board of Trustees under whose leadership the Colorado School of Mines Research Foundation, Inc., was continued.
Foundation began sponsored research for the mineral industry.

Melton Succeeded by Crabtree

In 1955, Vernon Mattson resigned to go with Kerr-McGee Oil Industries, where he is now manager of Mines and Milling, and he was succeeded by Edwin H. Crabtree, Class of 1927. Crabtree came to the Research Foundation from the post of deputy manager of the Atomic Energy Commission in Grand Junction, and prior to this, director of Milling for the Eagle-Picher Co. He has held an impressive list of professional positions, has received distinguished recognition from "Engineering and Mining Journal" and AIME, and is now president of the Colorado School of Mines Alumni Association.

During the past 11 years the Research Foundation has grown from a corporation with an initial capitalization of $2,000 to a company that now has a payroll exceeding $65,000 a month. The Research Foundation also draws on the staff of the School of Mines on occasion for consulting specialists and employs several part-time students a year for supporting work.

The specialists who staff each of the operating Divisions of the Research Foundation are encouraged to work on formal graduate study at area colleges and universities at Research Foundation expense. Junior engineers and technicians are subjected to intensive training courses designed by their Division heads, and to continuing programs of self-improvement. All men and women of the Research Foundation are carefully chosen experts, and together they represent an unusual collection of technical talent that would be difficult to equal.
Recent Achievements of the Mines Research Foundation

The Colorado School of Mines Research Foundation reports on investigations that have brought about the successful operation of plants in areas throughout the Free World. Many millions of dollars have been spent on the construction of new plants and on the design of existing facilities as a result of Foundation evaluation and planning.

The Research Foundation has played a substantial part in the production of every uranium mining field in the United States and several in Canada.

**Flotation Process for Phosphates**

The Research Foundation developed the first successful flotation process for Western phosphates. The first plant using this process has been in operation and another is being built. Foundation investigations have led to the successful operation of two plants for phosphate rock in Africa, and at least one phosphate plant has been under successful operation for many years as a result of Foundation developments.

Another study has led to the development of a process for the production of phosphoric acid, and studies are now underway to produce a wide variety of potassium chemicals.

Research Programs Undertaken

Research programs have been undertaken involving the recovery of all from tar sands, the removal of ash from graphites, the purification of clays, the analysis of complex and difficult materials, and the survey of chemical markets for new products in mining industry operations.

Pipe line transportation studies have been made for handling copper concentrates in Chile, limestone in California, coal refuse in Utah, iron ore tailings in Quebec, bauxite in Jamaica, and sulphur in Alberta.

The Foundation has played an important part in mine developments and ore reserve studies for large American uranium operations. One such project involved the stripping of some 50 million yards of overburden—representing an excavation equal to that made for the Panama Canal.

Explosive studies have been made using dynamite, sodium nitrate, and other explosives.

Research Foundation personnel have worked with the Navy in the field of physical metallurgy—one the production of ductile molybdenum, and the recovery of metals in solution. It has studied sources of atmospheric sound for the Office of Naval Research, and methods of driving piling into ice and permafrost, with results for the Corps of Engineers.

In these and other assignments, the Foundation scientists and directors have displayed versatile technologies and abilities. Their investigations have many times resulted in successfully operating plants and greater profits for industries.

Organic Compounds studied

In the field of liquid-liquid extraction, the Foundation has pioneered in the study of applications of many new organic compounds which may be used to recover purified metal concentrates from both acid and alkaline leach solutions. Some of these extraction processes are now in commercial use by uranium mills. Other developments concern the use of new reagents for the recovery of niobium, molybdenum, thorium, and vanadium.

The development of gaseous reactions for the recovery of metals directly from dry ashes or concentrates may well prove to be a "break-through" in the field of metal recovery technology. The Foundation has developed new techniques which render gaseous chlorination reactions selective toward some metals.

Research Foundation has been active in pollution problems involving both water-borne and air-borne industrial wastes.

Foundation's currently operating pilot plants cost nearly a half-million dollars to build and equip. The organization is currently operating 36 individual bench scale laboratories; it has complete and modern office, shop, and warehouse facilities. It offers industry complete analytical laboratories for control work; complete utility services for all types of power and all types of waste disposal; and a crushing unit capable of handling material up to six inches in size through gyratory, jaw, and cone crushers, hammermills and rolls. It is equipped with laboratories and pilot plants that are equal to easily any problem.

In the past few years the scope of its operations, its problems, and its capabilities has broadened within the physical, chemical, ceramic, metallurgical, and nuclear fields.

Recent Growth Noteworthy

The very recent growth of the Research Foundation is worth notice. In his report at the end of the fiscal year, ending June 30, 1960, E. H. Crabtree reported that "the cost of research work completed by the Research Foundation during the year 1959-60 amounted to $1,400,000, compared with $695,000 for the preceding year. Of this amount, some 14 per cent was for Federal and Colorado State projects, while the balance was for industrial concerns. By the end of the year, total permanent capital improvements to the original research facilities amounted to $640,000. Of this amount, $313,000 had been provided during the year."

"During the year, a new 7300-square-foot extractive metallurgy pilot plant and a 10,000-square-foot, indepen-endability building were erected and are now in use."

"The facilities of the Research Foundation now constitute the most comprehensive laboratories and pilot plants for research for the mining industry available in the country."

A KOA RADIO and KOA-TV Salute to the Colorado "Mines" on their 50th Anniversary

Come to the "Mines-O-Rama" starting October 24th at First Federal Savings and Loan office, West 38th Ave.

First Federal also sponsors The Ben Martin Show, Mondays 8:30 P.M. and Wednesdays 8:30 P.M. on KOA Radio.

THE MINES MAGAZINE • OCTOBER, 1960
On behalf of the Bureau of Mines, Department of the Interior, I want to extend congratulations to The MINES Magazine on its 50th Anniversary.

Your excellent publication, like the great institution it represents, has earned respect throughout the mineral industries by the high quality of its service over the past half-century.

As you know, the Bureau of Mines also is observing its Golden Anniversary this year. During the period since 1910, the Bureau and the Colorado School of Mines have joined forces in many cooperative research projects. These have greatly benefited the mining industry and the entire economy by the high quality of its service over the past half-century.

Our best wishes to you, Colonel Fertig, and to your associates on The MINES Magazine.

MERRING J. ANKENY

In view of this long and productive association with the School of Mines and The MINES Magazine, I think it fitting on this occasion to pledge ourselves to increased cooperative effort and even greater progress in the conservation and development of mineral resources during the years to come.

By DR. SAM B. CHASE, JR.

Problems and Processes of Monetary Management*

*This article was prepared under the personal direction of Dr. Clar­ence W. Tow, vice president, Federal Reserve Bank of Kansas City, for The MINES Magazine.

Polonius’s injunction to Hamlet, “Neither a borrower, nor a lender be,” may have had some force in 17th century Europe, but the observance in the 20th century world of giant industrial corporations, pension plans, $3,500 automobiles, and debt-financed wars is hard to detect.

Credit, in fact, played a major role in the economic development of this country from its very beginning. Today the national credit market is dominated by a vast network of independent but interrelated institutions ranging from insurance companies and commercial banks with assets in the billions, to the smallest credit unions with assets of less than $5,000. Also included are investment banks, pension funds, accounts receivable “factors,” savings and loan associations, and personal finance companies, to name a few. Through these institutions flow the funds that finance a wide variety of activities, including business expansion, retail trade, home buying, and even travel to Hawaii.

The major role played by credit in financing expenditures makes fluctuations in the cost and availability of credit a very potent force in shaping economic developments, investing them with a public interest that is reflected in the multitude of public agencies whose activities are wholly or partly concerned with financial matters. Of these institutions, the most powerful is the Federal Reserve System. The primary function of the Federal Reserve System as it is conceived today is to influence the cost and availability of credit in the public interest. It does this mainly through the use of controls over the lending potential of the country’s commercial (checking account) banks, which are the most important single lending group in the economy.

When economic developments appear to call for easier credit, Federal Reserve policy can promote it by increasing the banks’ ability to lend. Conversely, when inflationary developments threaten, Federal Reserve policies can bring about a restriction of bank lending power. In either case, the effects are diffused throughout the credit market, raising or lowering the strength of demands for goods and services that are financed by borrowing.

The role of Federal Reserve policy has not always been conceived as broadly as it is today. An understanding of the Federal Reserve System and its place in the American economy is perhaps best facilitated by reviewing the development of the System in a historical context.

Banking Problems in 1913

When the Federal Reserve System was established in 1913 by an act of Congress, its founders had in mind the solution of financial problems quite different from the ones that confront the System today. Up to 1913, this country’s banking system had been singularly undistinguished for its record of stability and solvency. Persistent failures of individual banks and the massive waves of bank insolvency accompanying the frequent financial panics of the times made serious inroads on the orderly growth of the American economy. The National Banking System, set up during the Civil War period, had made possible some improvement by bringing many of the larger banks under Federal supervision. But the banking system of the United States remained primitive and unreliable compared with those of the advanced industrial and trading nations of Europe.

The major nations of Europe had accumulated a considerably greater backlog of banking experience.
than we had. But of equal importance was the fact that they had equipped themselves with central banks. These were not only a guarantee of the value of their own currency but enabled these countries to meet their banking problems more effectually than we could.

Unique Feature of Central Banks

Although there are many substantial, as well as formal, differences among the central banks of the U. S. and other countries, it is a significant fact that we have in common the power to "create" and "issue" money. It is a power that Congress bestowed on the Federal Reserve System which was to be America's central bank.

The founding fathers provided for a central bank that could expand or contract the money supply, reserving reserves to service the basic features of the financial collapses that had plagued the nation.

The Roots of Financial Panics

One of the distinctive features of a private enterprise, industrial economy is the more or less recurring swing in economic activity known as the business cycle. During the course of a rapid upswing in business activity, banks, responding to increased business needs, are tendency to expand their deposits and expand their volume of credit. However, at some stage, some central bank is expected to reverse the trend of credit expansion.

The financial panics of the 19th century proved to be the first opportunity to operate under more or less "normal" conditions with a consequent expansion of their deposit liabilities. Although it is possible for Reserve banks to vary the attractiveness of member bank borrowing by changing the rate of interest charged on discounts, the rate is set by Congress. Federal Reserve purchases of Treasury securities (or contracted by sales, played an important part in opening up new vistas of monetary management. For the Federal Reserve can change the level of the interest rate by the beholding of member banks through the use of an "open-market" facility. The pricing of the security is then set by the banking system in the form of "discount credit outstanding" that has never since been equaled. It is important to recognize that such a policy, necessary as it may be for the control of the war effort, can have serious inflationary results. The postwar inflationary trend broke sharply in May 1920, with the onset of a depression that lasted well into 1921. By comparison with their earlier experience, the country's commercial banks stood up reasonably well under the test of those years. It was not until the wholesale failure of member banks in 1929, and especially from 1930 to 1933, that the Federal Reserve had its first opportunity to operate under more or less "normal" circumstances. During the early part of this period the significance of what had been regarded as a rather inconsequential provision of the Federal Reserve Act had become apparent to Federal Reserve officials and others interested in monetary management. The provision was one that might be used to offset operating expenses when income from interest and discounts was low. Congress had empowered the Federal Reserve banks to "discount" government securities. The purchases were to be made in open competition with the Treasury—hence the term "open-market operations" used to describe the purchases and sales of government securities by the banks in order to mitigate or counteract fluctuations in the demand for currency.

Open-Market Operations Create Reserves

What was not seen at that time was that when Federal Reserve banks buy government securities they simultaneously create reserves in the banking system with increased reserves, Federal Reserve purchases of Treasury debt are paid for by checks drawn on the Reserve banks themselves. When these checks are presented for collection by member banks, payment is made by Federal Reserve checks that present the checks. There is no compensating loss of reserves by other banks, and the resultant increase in the reserve base of the commercial banks permits them to expand their own loans and investments with a consequent expansion of their deposit liabilities.

Conversely, when the Federal Reserve sells off a part of the government securities it is generally paid by check. The collection of these checks usually involves charging them against the reserve assets of the commercial banks. The banks have then lost reserves, and their ability to supply credit to their customers is thereby diminished. The Federal Reserve is thus able to get rid of reserves in the same manner that the commercial banks are the same task. Even before the 12 Reserve banks could establish a routine of operations, the events of the period led to an increase in discount credit outstanding that has never since been equaled. It is important to recognize that such a policy, necessary as it may be for the control of the war effort, can have serious inflationary results. The postwar inflationary trend broke sharply in May 1920, with the onset of a depression that lasted well into 1921. By comparison with their earlier experience, the country's commercial banks stood up reasonably well under the test of those years. It was not until the wholesale failure of member banks in 1929, and especially from 1930 to 1933, that the Federal Reserve had its first opportunity to operate under more or less "normal" circumstances.

The Discount Privilege

The Federal Reserve Act required member banks to borrow from Reserve banks on the security of "discountable" bills of exchange. The Federal Reserve banks in an increase in discount credit outstanding that has never since been equaled. It is important to recognize that such a policy, necessary as it may be for the control of the war effort, can have serious inflationary results. The postwar inflationary trend broke sharply in May 1920, with the onset of a depression that lasted well into 1921. By comparison with their earlier experience, the country's commercial banks stood up reasonably well under the test of those years. It was not until the wholesale failure of member banks in 1929, and especially from 1930 to 1933, that the Federal Reserve had its first opportunity to operate under more or less "normal" circumstances.

Vulnerability of the Banking System

Among financial institutions, banks tend to be particularly vulnerable during periods of financial upheaval. A bank suffering deposit losses can meet its other obligations by selling assets. This is virtually impossible when the market for securities and goods is depressed. The result is a "concentration" of bank reserves and thereby enables banks to extend credit more freely. This, in turn, tend to confirm the adverse expectations behind the original selling and thus to accentuate the attempts to sell securities and goods thereby driving the markets for securities and goods diy form of high quality liquid assets may be pushed to inadequate status of affairs for a nation that wishes to achieve an orderly growth in its productive capacity. Banking systems have the social function of expanding credit and the orderly pursuit of economic affairs.

In framing the Federal Reserve Act, Congress understood that the central banking system fundamentally similar to the banking systems of Europe and they also believed that the Congress bestowed on the Federal Reserve System which was to be America's central bank. The founding fathers provided for a central bank that could expand or contract the money supply, reserving reserves to service the basic features of the financial collapses that had plagued the nation.

Discounting for War Finance

The importance of discounting as a source of additional bank reserves was demonstrated early in the history of the Federal Reserve System. Even before the 12 Reserve banks could establish a routine of operations, the events of the period led to an increase in discount credit outstanding that has never since been equaled. It is important to recognize that such a policy, necessary as it may be for the control of the war effort, can have serious inflationary results. The postwar inflationary trend broke sharply in May 1920, with the onset of a depression that lasted well into 1921. By comparison with their earlier experience, the country's commercial banks stood up reasonably well under the test of those years. It was not until the wholesale failure of member banks in 1929, and especially from 1930 to 1933, that the Federal Reserve had its first opportunity to operate under more or less "normal" circumstances.

Changing Views of Monetary Management

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World War II and Inflationary Aftermath

The financing of World War II provided a clear demonstration of Federal Reserve power to provide for credit expansion to finance large government deficits and record government outlays, only partly matched by increased tax receipts. The government financed a deficit of $120 billion from fiscal 1942 through fiscal 1946. To finance this deficit it was necessary for the Treasury to engage in a massive borrowing campaign, the greatest in the history of the world. To this end, it was necessary to maintain interest rates on government securities at levels that were said to be consistent with and capable of providing for an expansion of new bank reserves to provide for an expansion of new credit. With the development of a commercial banking system with reserves that enabled it to support decisions of the banking system to expand credit, the quality of thinking about the objectives of monetary policy as well as the understanding of its operation were greatly advanced.

Support of Government Securities Markets

Therefore the Federal Reserve undertook to ensure all the necessary funds for the government at interest rates of 2½ percent or less. This policy involved extensive Federal Reserve open-market purchases, which directly absorbed part of the increased Federal Reserve and provided the commercial banking system with reserves that enabled it to support decisions of the banking system to expand credit. As the system developed, the Federal Reserve was able to purchase Treasury debt at prices that were able to pay for purchase of Treasury debt with reserves that enabled it to support decisions of the banking system to expand credit. The process of keeping down the interest cost of the Federal Reserve, but it was highly inflationary. Vernon's increases in reserve requirements, during the war, the inflationary potential built up during the emergency was unleashed. During 1947 alone the consumer price index advanced by 14 percent.

Developments in the 1950's

Since that time the problem of inflation has been a persistent one. It has been ever present in the minds of bankers and economists. The question of whether or not the Federal Reserve has done enough to control inflation is one that continues to be debated by economists and other experts in the field of economics.

The experience of early 1960 provides an illustration of the point. As the chart shows, the recent upward trend of interest rates has accelerated. This trend has continued since then. It has been accompanied by a decrease in the demand for new issues of corporation bonds and government bonds. The experience of early 1960 provides an illustration of the point. As the chart shows, the recent upward trend of interest rates has accelerated. This trend has continued since then. It has been accompanied by a decrease in the demand for new issues of corporation bonds and government bonds.
PLANT NEWS

Metal and Thermit Corp. Expands Zircon Interests

Metal and Thermit Corp. has expanded its interests in the zirconium field, with acquisition of the resources and facilities of Orefraction Minerals Inc., has been announced by R. H. Martin, M&T president.

Orefraction Minerals Inc., with facilities at Andrews, S. C., supplies granular and dry milled zircon for the foundry, refractory, ceramic, and glass industries. Metal & Thermit Corp., with facilities at Denver, with diversified operations in chemicals, metals, alloys, minerals, and welding supplies and equipment, owns or operates manufacturing and processing facilities in Australia; Monterrey, Mexico; Carterton, N. J.; and Beaverdam, Va.

"M&T can now offer a complete line of granular zircon, as mined through all particle sizes down to zero extremely fine granular material with a grade, with the finest quality control possible. Added to the facts of our new ceramic and high temperature laboratory at Rahway, N. J., our nationwide sales and technical service organization, we feel that this acquisition will enable us to offer the most complete line of zircon to all who use zircon," Mr. Martin said.

This represents an expansion of M&T's "very wide" end-use market for the manufacturers, and sale of a broad line of related products, in addition to Orefraction Minerals' unique zircon which is used in vitrified porcelain enamels, pottery, and tile products, and special tin ceramics used in electrical components and electronic devices such as capacitors, transistors, and transducers," Mr. Martin said.

Merrick Scale Appoints Sales Representative

The R. E. Roosevelt Co., P. O. Box 256, La Mirada, Calif., has been appointed sales representative for Merrick Scale Manufacturing Co., it was announced by R. H. Jackson, sales manager for the Passaic, N. J., manufacturer.

Merrick equipment is used extensively in coal and mineral mining, and in many other industries requiring accurate records as well as control of the weight of conveyer-carried bulk materials.

Clute Corporation Acquires Two Equipment Companies

J. H. Lowell, x-s, president of Clute Corporation, has announced the acquisition of two equipment manufacturing companies, Clute Corporation, Colo.—Ajei Iron Works, a custom metal fabricating firm, and Truck Equipment Co., which has been engaged in the fabrication of special material and personnel handling equipment for the utilities and railroad industries.

Lowell stated: "The Ajei plant is small, but one of the most complete fabrication facilities in the Denver area. It is fully equipped to handle the Clute custom line of air separation equipment and the recently developed Clute gas cleaner. The chrome plating shop, which can handle equipment up to 28 feet long, is the largest facility of its kind in the country." Acquisition of Truck Equipment Co. of Denver serves a two-fold purpose for Clute, Lowell explained. One, the addition of facilities and personnel will enable a major step forward in the production and sales of the Clute gas cleaner, conveying equipment and other Clute products. Two, Clute Corp. has added a little over a million dollars annual rate of sales in the growing field of material handling equipment.

Eastman Oil Well Survey Co. Buys McCague-Taylor Corp.

Philip D. Arbuthnot, president of the Eastman Oil Well Survey Co., has announced the acquisition of McCague-Taylor Corp., which is a leading West Coast oil well service company specializing in oil well surveying, washing and cementing tools. The company, with headquarters in Denver, commits regional offices in Long Beach, Houston, Lafayette, La., Cape, Oklahoma City, and Odessa, Texas, as well as representatives in all major areas of the world where oil is produced.

Allis-Chalmers Completes 10,000th Vibrating Screen

Allis-Chalmers has supplied the aggregate, coal and metallic mining industries with rotary screens for more than 75 years. Since the introduction of its vibrating screens in 1930, the company has sold more than 10,000 of them for domestic and foreign use, the latter built in its own plants abroad or in plants of licensees. These range in size from a 25,000-

WITH THE MANUFACTURERS

Tester

Dog and Dwell Trucks

Merrick Equipment has introduced two completely new, all-welded, air-operated 10,000-lb. and 16,000-lb. dump trucks; the M0001, 80-tons, all-wheeled unit with 8-lb. axles; and the M0002, 35-ton, 15-ply rated capacity, two-axle dump truck—both made by the new company, Merrick Company, formerly known as M Series. A third truck is the MB1500, an all and off-highway dump truck chassis.

The new model is the result of a thorough re-design on both M Series trucks placing the cab and driver far forward in the frame thereby achieving a better load distribution and better driver visibility form the cab. 18,000 to 25 tons. A high capacity front axle is provided to accommodate maximum front axle leading.

Brockman One-Ounce VCRS Vibrating Screen

Brockman One-Ounce VCRS vibrating screen destined for shipment to a Massachusetts gravel firm was viewed from (left) J. E. Dunn, veteran screen engineer; Joseph Gerlich, Field Engineer; R. H. Jackson, general sales manager; and Robert McLeod, general foreman. The heavy-duty light feature a versatile, well-shaped relief form for optical alignment, and a high quality form, adaptable to any position desired, the Decker plus root regardless of its use position. Reflects light from hard, heavy stamped steel and complete, and is perfectly suited for use on either vertical or horizontal mounting.

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Hydraulic Cylinders

A completely new line of low cost air and hydraulic cylinders, from 154" to 356" bore, is announced by Merrick Scale and Controls Co., Crystal Lake, Ill. The cylinders enable fluid power systems to achieve substantial cost savings when they are used for both original equipment or replacement purposes.

Features include one-piece aluminum piston; hard chrome plated piston rod; aluminum and copper; stainless brake tube; tube material, and welded and plated; and with adjustable cushions fitted.

Available in flush, front and rear flanges, and to or over maximum, the new Mo-Max "Cost Saver" air and hydraulic cylinders have proved both versatile and dependable on all field power applications.

Compressors

A new line of compact, preassembled two-stage rotary compressors is immediately available for all of the most frequent foundation problems, are announced by officials of Fuller Co., Catasauqua, Pa.

The new line includes two-stage models from 400-cfm to 1000-cfm capacity, with discharge pressures of 175 psi and discharge pressures of 45 psi. Direct drive cylinders are built in MIL-E-14499 and MIL-E-4155.
CATALOGS and TRADE PUBLICATIONS

(1000) CYCLONE CLASSIFIERS. Bulletin No. 814 by Frothingham, Experimental, Standard, & Bell. 26th St., Denver 14, Colo., gives information and data on the use of cyclone classifiers, including performance characteristics, applications, and troubleshooting.

(1001) WATER HEATERS. Bulletin No. 500 by American Water Heaters, 2561 N. 30th St., Milwaukee 10, Wis., describes his product line of storage and direct-fired water heaters, with emphasis on energy efficiency and performance.

(1002) GAS TURBINE. Bulletin G-123 by General Electric Co., Schenectady 4, N. Y., details the performance characteristics, applications, and installation details of their gas turbine units.

(1003) WASTE KING PRODUCTS. A 16-page, three-color, fully illustrated brochure by the Technical Products Div. of Waste King Products, Inc., Naperville, Ill., covers a wide range of products, including gears, bearings, and other industrial components.

(1004) LABORATORY EQUIPMENT. Announcer No. 60-6-73 by The Mine & Smelter Supply Co., Denver, Colo., presents a selection of laboratory equipment, with a focus on precision and durability.

(1005) SEWAGE TREATMENT. Bulletin No. 7315 by WABCO, Inc., Stamford, Conn., is an eight-page brochure detailing sewage treatment facilities, with a focus on efficiency and cost-effectiveness.

(1006) TRAXCATOR. Form No. 33015 by Caterpillar Tractor Co., Advertising Div., Peoria, Ill., is a 12-page book describing the design and engineering details of the CAT 966, the latest of Caterpillar's wheel Traxcators.

(1007) CENTRIFUGAL SEPARATOR. A four-page brochure by Chemical Machinery Division of Baker Perkins, 1000 Hess, Toronto, Ont., Canada, details the features and applications of their centrifugal separators.

(1008) AIR AND GAS DRILLING. 1960-1 Catalog by Well Completions, Inc., Box 1356, Denver 3, Colo., covers a range of topics in air and gas drilling, including equipment, methods, and safety.

(1009) SAFETY HATS. Catalog No. W5910 by Willson Products Division, Ray-O-Vac Company, Reading, Pa., is an eight-page descriptive flyer on Willson personal industrial safety hats and caps.

(1010) DRILL BITS. Catalog No. 60 by American National Drill Co., 310 W. Lake St., Chicago 6, III., includes detailed information on drill bits, with specifications and performance data.

(1011) BULLETPROOFING. Bulletin No. 100 by The Mine & Smelter Supply Co., Denver, Colo., details the process of bulletproofing, with a focus on materials and installation.

(1012) HYDRAULIC RAMPS. Bulletin No. 1010 by The Mine & Smelter Supply Co., Denver, Colo., covers the design and application of hydraulic ramps.

(1013) PIPE FABRICATION. An eight-page, two-color brochure by Stearns-Roger Mfg. Co., P.O. Box 5888, Denver 17, Colo., presents a range of pipe fabrication services, with a focus on quality and craftsmanship.

(1014) MINE TIMBER FRAMERS. An eight-page, two-color brochure by Stearns-Roger Mfg. Co., P.O. Box 5888, Denver 17, Colo., details the services of mine timber framers, with a focus on durability and reliability.

(1015) MOLY MOUNTAIN NEWS. Sept. 6, 1960 by Climax Molybdenum Co., Climax, Colo., is a newspaper devoted to the activities of the company's employees, with many illustrations and short news stories.

(1016) POWER MACHINES. Booklet 203-A by Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y., gives an overview of their products, with a focus on performance and reliability.

(1017) AMSTORE. Sales Brochure by Miller Bros., Inc., 1332 W. Ogden Ave., Chicago 7, III., details the features and applications of their Amstore system.

(1018) MINE ELECTRICAL EQUIPMENT. Bulletin No. 300 by The Mine & Smelter Supply Co., Denver, Colo., details the features and applications of their electrical equipment.

(1019) MINING TRUCKS. Catalog No. 60 by American National Drill Co., 310 W. Lake St., Chicago 6, Ill., includes detailed information on mining trucks, with specifications and performance data.

(1020) GYPSUM MILLING. Bulletin No. 2503 by Dorr-Oliver Inc., Stamford, Conn., is an eight-page brochure detailing the milling of gypsum.

(1021) GRANOLLA. Bulletin No. 2503 by Dorr-Oliver Inc., Stamford, Conn., is an eight-page brochure detailing the milling of granola.

(1022) DRUM HOISTS. Catalog AO 6002 by Vulcan Iron Works Co., 2960 South Fox St., Englewood, Colo., is an 18-page brochure detailing drum hoists and their applications.

(1023) PIPE FABRICATION. An eight-page, two-color brochure by Stearns-Roger Mfg. Co., P.O. Box 5888, Denver 17, Colo., presents a range of pipe fabrication services, with a focus on quality and craftsmanship.

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(1034) PIPE FABRICATION. An eight-page, two-color brochure by Stearns-Roger Mfg. Co., P.O. Box 5888, Denver 17, Colo., presents a range of pipe fabrication services, with a focus on quality and craftsmanship.

(1035) MINE TIMBER FRAMERS. An eight-page, two-color brochure by Stearns-Roger Mfg. Co., P.O. Box 5888, Denver 17, Colo., details the services of mine timber framers, with a focus on durability and reliability.

The long rows of photos of Mines athletes have been removed from the hall walls, and the clutter and sound of players preparing for practice is gone.

The multi-colored game boundaries have been removed from the upstairs floor.

Pool cues and ping pong paddles are now issued through the same equipment storage windows through which football immortals, Big Ed Metcalf and Lloyd Mckinley, threw fresh football gear.

In place of the old lockers and showers now stand pool tables and ping pong tables and the old swimming pool is now a storage vault.

The stone work above the main entrance still reads "GYMNASIUM," but the building is no longer the Colorado School of Mines gym. Just across 14th Street stands the new, one million dollar physical education building and in it are the pictures, the lockers, the athletic equipment--and the
memories of Mines sports. The old gym, the oldest physical education building in Colorado, has become the Colorado School of Mines College Union. The need for a place in which the students and faculty could gather was met this year when the School completed the refurbishing of the old gym as a temporary college union. It will serve this purpose until such time as the new union, a feature of the Horizon Plan, is realized.

Overstuffed sofas and easy chairs, occasional chairs and tables, game tables and new drapes now adorn what formerly was the Integral Club. The colors are bright and the atmosphere that of a new lounge. Even a planter has been added, and it was designed with the same paneling as the original woodwork.

Automat Replaces Snack Bar

The old snack bar has been replaced by an automat which serves everything from coffee to fruit and sandwiches.

The School secretaries, who formerly had their offices, now the Director of Student Activities holds forth as the School adds one more service and facility for the Mines family.

$25,000 Refurbishing Project

Some $25,000 in materials and labor has been expended on the refurbishing project, and almost all of it was performed by the Mines Buildings and Grounds staff. The lone major exception to the "do it yourself" technique was the new canteen, which has been taken over by the national Canteen system. The firm installed the bank of nine automatic vending machines and enclosed the entire installation in paneling.

Dedication on Homecoming Day

The dedication of the college union will take place during an appropriate festivity—Homecoming—on October 29th. Last year the new gym was dedicated at Homecoming.

Future Use of Building

Once the new union is completed—the School has asked for Federal loan funds to construct such a building—the old gym will probably become the home for another of Mines activities. Perhaps a research center, maybe a dormitory, or even offices.

Whatever its future, the old gym will serve well. The versatile and well-constructed building has already borne the brunt of 52 graduating classes and, according to the School construction staff, it appears ready to take on another 52.

Congratulations to
THE MINES MAGAZINE

For 50 Years Service to
THE MINERAL INDUSTRY

THE GEOPHOTO GROUP

CALGARY
ALBERTA CANADA

DENVER
COLORADO

Low cost electric service is a prime requisite for growth in population, industry and mining. It is our pledge to continue this service as Colorado grows in the future.

PUBLIC SERVICE COMPANY OF COLORADO
The Mines Magazine — Reminiscing

Back in 1910 there was no cold war, the world was peaceful and our nation had pulled out of the depression by the panic of 1907. Enrollment at the Colorado School of Mines had returned to normal with 480 men in the graduating class. The Colorado School of Mines was 25 years old but this particular year of 1910 was to mark the beginning of an enterprise which was to continue for many years; this was the decision reached at the annual meeting of the Alumni Association. The Board of Publications decided to publish a monthly magazine.

To recall the problems met in establishing the magazine and to repeat the events with the same title, which was published in the October 1915 issue, which marked the 25th anniversary of the founding of The Mines Magazine.

"On this 25th anniversary of Mines Magazine our thoughts go back to the early years of the Alumni Association and to the officers who then guided its affairs.

"At the annual meeting in 1910, when the Association was 15 years old, Frederick Titusworth, '06, was elected president; Carl Allen, '05, vice-president; Arthur Hedge, '00, secretary; F. C. Steinhauser, '99, treasurer. Other members of the Executive Committee were: Thomas P. Ellis, '00; William W. Johnson, '91; and Lewis B. Skinner, '95. Shortly after they were installed, they decided that a full-time published each month would keep the members of the Association in closer touch with each other and with the school. At that time, there was no editor or secretary to employ a person, preferably a Mines graduate, to edit and manage the Magazine and attend to the publication business. Other members of the Executive Committee were elected president; Carl Allen, '05, vice-president; and Lewis B. Skinner, '95. Shortly after they were installed, they decided that a full-time publication each month would keep the members of the Association in closer touch with each other and with the school.

"Acceptance of this job was especially complicated because the magazine had not been published for about a year and the job was without a secretary and editor for that length of time. My first duty was to go to the post office and get three huge bags of mail, including books for non-subscribers to the Magazine, and sending letters to the people who had joined the Association and the Capability Exchange as well. Jay Lonergan, '05, was chosen for this position as assistant secretary of the Association and editor of the Colorado School of Mines Magazine.

First Issue Published October 1910

"The first issue was published in October 1910. The issue was 24 pages and included a 6"x9½". The main article was "The Ore Dressing Friday Evening," by Prof. W. H. Thorp. It was continued for some time, but this group headed by William S. Clark Barb was chairman of the Publication Committee.

Firs! Petroleum Issue in 1936

"About this time someone formulated a policy for the Magazine. "The Mines" was issued in honor of the Mines football team, and was published only for the football season. It was during this period that "Petroleum Notes" were added to the Magazine. These were discontinued in 1938, but the Magazine continued to be known as The Colorado School of Mines Magazine after the first issue of 1932, when the name of the school was changed to Colorado School of Mines Magazine, by which title it has continued to be known.

Publications Committee Appointed

Charles M. Rath, '95, as president of the Alumni Association, appointed a Publications Committee in 1925. For the first time, the Alumni Association was to have exclusive responsibility for the policy of the Magazine, obtaining subscriptions and advertising, as well as the editing of the Magazine. The name of the Magazine was changed to "Colorado School of Mines Magazine" in September, 1928, he said, "In January, 1928, just nine months after" the new name was adopted, the Magazine was published as a 16-page paper, carrying six pages of advertising, which represented 32 advertisers. This September number was the first for the Colorado School of Mines Magazine to have a cover that ranged from 1½" to 2½". The number of pages of advertising in this September number was exactly equal to the number of pages in the first issue of 1932, printed 25 years ago. This fact is, several times accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepted tradition as early as 1930, and that the painting of the "M" on Mt. Zion was at least an accepte..."
were then in service. Individual pictures were used in many other fields. Much of the success of The Magazine can be attributed as the decision reached when this question was fixed and school-wide participation in sports was encouraged. Emphasis on winning a team in the Colorado School of Mines has extended its influence into the fields of petroleum and related subjects. The growth of The MINES Magazine has extended its influence into the fields of petroleum and related industries with a somewhat pessimistic outlook. The '59 Directory abandoned the old size and format and appeared as a 6" x 9" book which was small enough to be carried easily. There was no advertising in the first edition. When George Roll accepted the position of managing editor in March 1958, he said that he did not wish to force a change in the size. His resignation became effective on February 1, 1960, at which time he was succeeded by Col. Wendell W. Fertig.

Magazine Celebrates 50th Year

In January 1952, the cover design was changed to show the whole globe with the motto "World Coverage of the Mineral Industry." This was usually run in conjunction with a black and white photograph. Regular issues of the magazine ran to approximately 60 pages; in 1953 Petroleum Issue opened up to a total of 163 pages while the Special Mining Issue carried approximately 60 pages. This size was continued for 2,000 copies. The special Petroleum number had 96 pages with 57 advertisers listed. During the year the editors continued to secure future of mining and petroleum industries with a somewhat pessimistic outlook.

Beginning of Era in 1939

1939 marked the beginning of an era, for Frank G. Bowman, Jr., became editor and publication director. He served in that capacity for 10 years and other names appeared. With the Manufactures, Catalogue and Trade Price Guide Section, Engineering Data Tables, Personnel, News, and Alumni activities and the school curriculum. A general theme was assigned to a specific issue; as an example, "The MINES Magazine" in bold white letters appeared on the cover with the black background in the upper left hand corner. "The MINES Magazine" in bold white letters appeared on the cover with the black background in the upper left hand corner.

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LETTERS TO THE EDITOR

RICHARD N. SPENCER, '54, metallurgical engineer, Foreign Division, U.S. Bureau of Mines, P.O. Box 4096, Pima, Ariz., writes in part:

As a part of my job here in Peru, I am involved in helping to establish a Department of Metallurgy in the University of Engineering. Much of this project is going slowly and quite satisfac­
torily, but now with the return of three Peruvian engineers, work is progressing at a much faster rate.

I was wondering if we could get the names of any of the students who are graduates of the Technical Institute of Mining and Metallurgy program that was going on several years ago in Peru, in order to check their progress on the subjects covered in the Institute.

W. W. Cline, Ex-29
The Drilling Company
Sello, Lima, Peru

JAMES B. COPPELAND, '57, Sunshine Mining Co., P.O. Box 1084, Kelvin, Alberta, writes:

"Well, it has been five months since I joined the engineering staff of the Mining Sunlight Co. Indeed it has been a stimulating experience and a wonderful opportunity which I have used much more than I anticipated at the time I graduated.

Upon joining the staff I was assigned to the rolling mill project. This project involves a major expansion of the mill's rolling mill capacity. The project is being designed to meet the demands for increased production of steel billets and slabs in the future. I have been working closely with the project engineer and the mill operation team to ensure the success of the project.

The most unusual aspect of it is that I have had the opportunity to work with two different engineering firms as a part of the project team. This provides me with valuable experience in working with various engineering firms and teams.

(EDITOR'S NOTE: Here is a friendly reminder that you too may have your name at the university level. The AIME Foundation would pay real dividends.)

WALTER MAYER, '22, 1958 N. Lopat Ave., Chicago 41, III., writes about his experience as a student at MIT:

"The story is long and most enjoyable but I think that the most important thing to remember is the quality of the education that was received.

I have been on a tour of the company's facilities and have been impressed with the dedication and hard work of the employees. The company has a strong commitment to safety and I am confident that they will continue to provide a positive and safe work environment for all employees.

When I arrived at the company I was given a tour of the facilities by the manager. I was also introduced to the rest of the team and was made to feel welcome. I have been impressed with the company's commitment to training and development.

The most important aspect of my stay has been the opportunity to learn from experienced engineers and to contribute to the success of the project. I have learned a great deal about the engineering process and have gained valuable experience.

(EDITOR'S NOTE: Here is a friendly reminder that you too may have your name at the university level. The AIME Foundation would pay real dividends.)

J. R. VAN OSBLOEL, address unknown.

1954

CHARLES J. BAROCH has joined the staff at Randol Memorial Hospital as an engineer in the Executive Metallurgy Division. Prior to joining Randol, he was employed as a senior metallurgist for Arco Petroleum and Mineral Affairs, with petroleum and mineral affairs, in Saudi Arabia. His mailing address is 2501 Boyd, Houston, Texas 77201.

Howard E. Iton, '41
President
Empire Geological Inc.
2000 Camp Bowie Blvd., Ft. Worth, Texas

WILLIAM KROWE KELLOGG, '43
Kelleisy Engineering Company
Geologists/Geophysicists
1201 N. Macarco, Atlanta, Georgia
Spence 4-1734

J. F. JOHN, '39
Assistant
Consulting Geoscientist
450 S. 17th St., Denver, Colorado

THE MINES MAGAZINE • OCTOBER, 1960
THE MINES MAGAZINE • OCTOBER, 1960
Alumni News


Your Ballot for Election of 1961 Alumni Officers To Be Sent Out in October

Late in October you will receive a letter from the Alumni Association. This letter will contain your ballot for election of the Officers of the CSM Alumni Association for the year 1961. In addition, there will be a proxy notice asking that you authorize the Managing Director to cast your vote to amend the Certificate of Incorporation of the Colorado School of Mines Alumni Association, Inc. The proposed amendment will be described in the letter accompanying the proxy statement and will set forth that the purpose of this amendment, which will simplify handling of the routine business of the organization and update the terminology used in the original charter. It does not alter the organization but does change certain names, as for instance; members of the Executive Committee would under the amended Certificate be known as the Board of Directors. This change will simplify the problem of dealings with banks and other institutions.

When you receive your ballot, vote for candidates of your choice.

When you receive the proxy, sign and return it at once so that it may be counted at the annual meeting. If you fail to return the proxy your vote is, under the laws of the State of Colorado, recorded as a negative vote. As a result, failure of the majority to return their proxies would defeat the proposed amendment.

The annual meeting of the Colorado School of Mines Alumni Association will be held at the Lakewood Country Club, 6:30 p.m., Thursday, Jan. 26, 1961.

Hyde, '22, Helps Develop Korean Mineral Resources

Pitt W. Hyde, who received his E.M. degree from the Colorado School of Mines in 1922, has been helping Korea to increase the usefulness of its anthracite coal and to explore other mineral resources. As mining advisor for the U. S. International Cooperation Administration, Mr. Hyde and his staff helped to conduct experiments with lignite and to survey iron deposits.

When Mr. Hyde went to Korea in 1957, he set up a program to improve the quality of anthracite coal by screening and washing a normally low-grade product. He and his staff also found a promising supply of lignite, and experiments now are planned to determine the possibility of producing gas from "brown coal." Mr. Hyde has completed his assignment in Korea and his present mailing address is 763 East H St., Ontario, Calif.

Knapp, '40, Assistant Fabricating Works Manager At Alcoa's Mosena Works

As of Sept. 1 Robert W. Knapp, Met. E.'40, became assistant fabricating works manager of the Mosena operations of Aluminum Company of America.

Born in Sault Ste. Marie, Ontario, Canada, Mr. Knapp was educated in the schools of that community and in 1940 received his metallurgical engineering degree from the Colorado School of Mines. After his graduation from Mines, he was employed as a metallurgist at Aluminum Company of America's Mosena, N. Y. plant. A year later, he became assistant foreman in the reroll department, and in 1943 transferred to the Newark (Ohio) Works. Alcoa built and operated Defense Plant Corporation.

In 1945 he returned to Mosena and served as assistant superintendent of the reroll department and later technical assistant in the fabricating works. In 1949 he was named assistant works manager of Alcoa's Vancouver (Wash.) Works, and in 1955 he transferred to the company's Pittsburgh office as a production assistant in the fabricating division.

Mr. Knapp is married and the couple has two children—a daughter and a son. His mailing address is P. O. Box 264, Mosena, N. Y.
Peaker, '32, Re-elected President U.S. Beryllium

Don E. Peaker, Gen. Eng., '32, was re-elected president and treasurer of U.S. Beryllium Corp. at the annual meeting of stockholders held recently in Pueblo, Colo.

Mr. Peaker said his firm "has more commercial grade beryllium ore mined, stockpiled and blocked underground than any other beryllium mining operation in the United States."

He said cash value of ore mined and stockpiled for delivery to Mineral Concentrates & Chemical Co. in Denver was about $145,000. The firm's Boom Mine produced more than 1200 tons of ore in the past year, four times more than in any other year.

Kellogg, '43, Directs Geophysical Surveying Department for Fairchild

William C. Kellogg, a 1943 geological engineering graduate of the Colorado School of Mines, has been placed in charge of Fairchild Aerial Survey's new ground geophysical surveying department.

Surveys to be offered by the new department will include ground magnetics, ground electromagnetics, ARNAG, radiometry, and refraction seismography.

Kellogg, now chief geophysicist for Fairchild, joined the company in 1948 as a member of the airborne magnetometer department.

Robert C. Earlougher, a 1936 petroleum engineering graduate of the Colorado School of Mines, has been named to the executive committee of the advisory board for the International Oil and Gas Educational Center by the Southwest Legal Foundation. He will serve as chairman of the petroleum engineers committee for the center designed to afford educational programs including all facets of the oil industry.

Mr. Earlougher, who is president of Earlougher Engineering, Inc. of Tulsa, Okla., and a member of the Interstate Oil Compact Commission's Secondary Recovery and Pressure Maintenance Committee, was a recipient this June of the School of Mines Distinguished Achievement Award.

Boyd, '32, Speaks at Meeting Of American Bar Association

James Boyd, president of Copper Range Co., who received M.S. and D.Sc. degrees from the Colorado School of Mines in 1931 and 1934, told members of the legal profession that they would play important parts in future legislation and tax rulings as the industry attempts to stabilize its base metals production and avoid critical shortages.

Speaking before members of the American Bar Association at their annual meeting Aug. 30, in Washington, D.C., Mr. Boyd said restrictive legislation and unsuitable tax laws prevent stabilization of the base metals—copper, lead and zinc.

"Only a measure of cooperation within the base metals mining industry, not overproduction and underproduction, would enable the industry to control the excessive fluctuations of price," he said.

The industry, he admitted, has not yet learned to handle efficiently supply and price fluctuations. "Perhaps you lawyers can find a way to modify the anti-trust laws to eliminate this disrupting factor," he said.

The Copper Range Co. president asserted that the most imaginative legal skills are needed to give mining operators protection during their "needle in the haystack" search for new ore deposits, and establish firm titles before mining of a discovery can be undertaken.

Predicting that within 10 years the expanding economies of the Western nations will create demands for base metals in excess of current capacity to produce, Dr. Boyd said the industry will have to find and develop new deposits.

"Basic policy for the national interest of the country requires the continuation and strengthening of incentives if we are to maintain our supply of minerals for the future," he said.

E. E. Wing, '60, Joins Cities Service Oil Co. Graduate Training Program

Edwin E. Wing, a 1960 petroleum engineering graduate of the Colorado School of Mines, has joined the college graduate training school of Cities Service Oil Co. He will be initially assigned to the company's Graduate Training Program in Bartlesville, Okla.

During the training period, Mr. Wing will be familiarized with the over-all operations of the full-integrated oil company, with permanent assignment in one of the company's divisions as a climax to the training program.

Bryant, '53, Will Manage Susquehanna-Western's Metallurgical Division

G. H. Bryant, E.M., '53, has been named manager of Susquehanna-Western's metallurgical division in Denver. The appointment was announced by Allen D. Gray, M.E.M., '52, President of the Denver-based company, Susquehanna-Western, Inc., and Mines and Development Inc., 777 Grant St.

For the past two and a half years, Mr. Bryant has been mill superintendent at the company's uranium mill and sulfuric acid plant in Riverton, Wyo.

After attending College of Puget Sound for two years, Mr. Bryant transferred to Mines in 1950. Graduating from Mines in 1953, he was employed for a year by Schlumberger Well Surveying Corp., at Sidney, Neb.; spent two years mining tungsten, dravite and uranium, and was employed a year and a half as mill foreman by Mines Development in Edgemont, S. Dak. uranium property.

While a student at Mines, Mr. Wing was a member of ATO social fraternity and Tau Beta Pi. His parents, Mr. and Mrs. James Wing, live at 4841 S. Cherokee, Englewood, Colo.

John J. Brady Undergoes Pre-Flight Training

Aviation Cadet John J. Brady, x-'61, who attended the Colorado School of Mines before entering pre-flight training at the Naval Air Station, Olathe, Kan., is undergoing training at Pensacola, Fla., where he is studying aviation science, navigation, and other military and technical courses to prepare him for duty as a flight officer.

Upon completion of pre-flight, he will underwrite primary flight training at Stukey Field Naval Auxiliary Air Station.

Valini, '33, Directs Undergraduate Research Participation Program

Under the direction of Melden E. Valini, Met. E., '32, four qualified students, selected from the senior class of 1956 from Michigan College of Mines and Technology, participated in special research projects in the schools of chemistry, metallurgy, geophysics, and mineral dressing. Dur-
Mr. and Mrs. Sullivan, the former Andria, Va., and hoe, N.Y., and their three children, son High School in Mount Vernon, in 1951, Mr. SuUivan attended Edu­

devlopment of new materiel, methods, of Engineers for the research and de­
ployed since January 1959 at the Lab­

gical engineer in the Petroleum Research and Development Laborato­
rector of the U.S. Army Engineer

Sullivan, '51, Cited for Work of Mines—Geop. E. in 1947 and
two degrees from the Colorado School

as cited in the field in relation to mineral locations, filings, and the many other actions that could cause a company or indi­

eficit courses you may meet in graduate
tend some of the Denver Section meet­
dent Charles Ringer Co., 7915 Exchange

New headquarters, Tom and Nancy stopped

same statement that we have heard so of­

mined to come home. (We are sorry

to report that he is leaving for six months

have large backlog of orders on hand—that

CIDENT. The field work is rough, but has

now need a capable PARTNER to handle and

lowest Arizona climate and then re­

this was my first op­

consulting work for Continental Oi! Co.

beams, speed reducers, couplings,

that lovely Arizona climate and then re­

to come out to our office.

company or industry. (We are sorry

contractors; architect-engineering firms; gen­

ister in the Colorado School of Mines,

is distributor for belts, conveyors and is distributor for belts, conveyors and is distributor for belts, or more in sight.

by Mobil to Superintendent

planning, or mining, or petroleum, or con­

for Shell Oil Co., lives at 3612 Boyd St.,

came to Denver Section meetings, this was my first op­

lected the many changes that have taken place in the years since his last visit.

is headquartered in the city of Denver,																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Committees for the conventions with ref­
Mr. Hugh A. Wallis, Public Relations.

deadline for nominations will be

oral cooperation was discussed.

The financial statements for both May
are the omission from our dues card (again in
S. 555 W., Cedar City, Utah.

the page, and plans of the association. There were
AIME, Oct. 26-29, luncheon meeting.

(Continued on page 77)

ming address 4640 Cole Ave.,


carried.

The executive manager reported that the

1951; Mort Kline, '54; Randy West, '37;

spending party and picnic,


2215 E. Sycamore St., Anaheim

on the advice of the AADF

the duty at the Colorado School of Mines, and

R. E. McGraw, Section president,


the alumni at 399 Miners Lane, Apt. 10, Lafayette, Calif.

USE YOUR MINE FOR ADVERTISING—THE MINES MAGAZINE

Vol. 57, No. 8—October, 1960

THE MINES MAGAZINE

84
Washington, D.C., Section
Washington, D.C., Section had its annual picnic the evening of officers at the beautiful country home of Col. and Mrs. E. J. Rosser near Gainesville, Va., on Sept. 10. The following officers were elected for the ensuing year:

Alexander S. Wyner, '25, president
Leny M. Otto, '43, vice president
Horne T. Brower, secretary-treasurer.

Missouri
St. Louis Section
Pres.: Fred E. Rogers, 63
V. Pres.: Don L. Ellis, '40
Sec-Treas.: Recy E. Ramsey, Jr., '58
1511 NW 77th St., Kansas City 39
Regular meeting first Monday of each month.

Tuba Section
Pres.: Ernest W. Waddell, Jr., '52
V. Pres.: Howard E. Flick, '17
Sec.-Treas.: Charles J. Drenz, '62
324 S. 17th St., St. Louis 3, Mo.
Regular meeting third Monday of each month.

Pennsylvania-Eastern Pennsylvania Section
Pres.: J. M. Heim, '36
V. Pres.: John T. Furlong, '32
Sec.-Treas.: Joseph U. Smith, '50
7130 Thomas Blvd., Pittsburgh 14, Pa.
Meetings upon call of the secretary.

Texas
South Texas Section
Pres.: Jack Earl, '53
V. Pres.: Charles W. Williams, '52
Sec.-Treas.: Nick Shiff, '49
1511 Miners St., San Antonio, Texas
Meetings upon call of the secretary.

North Central Section
Pres.: Howard Reeder, '36
V. Pres.: John R. C. Clatworthy, '40
Sec.-Treas.: Jack L. Stroh, '37
3405 Avenue of the Americas, New York 1, N. Y.
Meetings upon call of the secretary.

Permian Basin Section
Pres.: William D. Owens, '45
V. Pres.: James F. Fucker, '52
Sec.-Treas.: Harley Holliday, '42
2104 S. Driskill, Lubbock, Texas
Luncheon meeting the first Friday of each month at Driskill, Lubbock.

Permian Basin Section
Permian Basin Section met on Sept. 2 for the beginning of the school year. The meetings are to be held on the first Monday of each month at Driskill, Lubbock.

Pacific Northwest Section
Pres.: Robert D. Ingalls, '38
V. Pres.: Walter J. Schalberg, '25
Sec.-Treas.: James F. Fucker, '52
Seattle, Wash.
Meetings upon call of the secretary.

Waste Management Section
Pres.: Richard K. Cline, '52
V. Pres.: John R. C. Clatworthy, '40
Sec.-Treas.: C. R. Robinson, '41
14026 S.W. 15th Blvd.
Seattle, Wash.
Meetings upon call of the secretary.

Canadian Section
Pres.: Joe S. Leir, '52
Sec.-Treas.: J. S. Fox, '52
4609 W. 41st Ave., Vancouver, B.C.
Meetings upon call of the secretary.

Lima Section
Pres.: Richard Storah, '50
V. Pres.: J. Maclean, '52
587 W. 4th St., Lima, Ohio
Meetings upon call of the secretary.

Barberville Section
Pres.: W. E. Smith, '38
V. Pres.: W. H. Curtosie, '47
Sec-Treas.: E. S. Hoy, '50
54 Parkview Drive
Barberville, Fla.
Luncheon meeting every Friday, Barberville.

Oklahoma
Barberville Section
Pres.: W. E. Smith, '38
V. Pres.: W. H. Curtosie, '47
Sec-Treas.: E. S. Hoy, '50
54 Parkview Drive
Barberville, Fla.
Luncheon meeting every Friday, Barberville.

Pennsylvania-Ohio Section
Pres.: J. M. Heim, '36
V. Pres.: John T. Furlong, '32
Sec.-Treas.: Joseph U. Smith, '50
7130 Thomas Blvd., Pittsburgh 14, Pa.
Meetings upon call of the secretary.

Ohio City Section
Pres.: Fred E. Rogers, '63
V. Pres.: Don L. Ellis, '40
Sec.-Treas.: Recy E. Ramsey, Jr., '58
1511 NW 77th St., Kansas City 39
Regular meeting first Monday of each month.

DISTRIBUTION OF COLUMBIA
Washington, D.C., Section
Pres.: Alexander S. Wyner, '25
V. Pres.: Ray R. Bissell, '40
Sec-Treas.: Homer T. Reina, '40

MISSOURI
Great Lake Section
Ray Watson, 613, 61st and Broad, Chicago 23, Ill.
Ray Watson writes: "Although the Great Lake Section has not had an election for several years, Charlie Hook and I are trying to revive some of its old-time activities. A meeting has been scheduled for October and is to be held at the home of one of the members in the Chicago area. If you have any activities that meet the criteria, there really are no officers, but be sure to let us know. A meeting is scheduled for October 13th. Meanwhile, we have been operating on the theory that the mail was directed to Chicago style. Charlie Ringer Co., 2038 Exchange Building, Chicago 17, Ill., and anyone visiting the Loop can obtain a copy. (Address letters to Great Lake Section heading).

Of course this situation is far from ideal, and we hope to remedy it soon. We have been limited lately but a group of us have been meeting regularly for Mines- industrial plants-chemical resistant equipment-chemical resistant materials. We still do not have a new address, sorry, wait.

PHILIPPINES
Baguio Section
Pres.: Francisio Joson, '28
V. Pres.: D. Ferriol, '49
Sec-Treas.: P. Antulius
Baguio Mining Co., Baguio

TURKEY
Ankara Section
Pres.: A. O. Sakaiya Caddesi 24, Ankara; Tel. 17880
V. Pres.: Claude FertiR, x-'27
Sec.-Treas.: Edgardo Villavicencio, x-'40

VENEZUELA
Caracas Section
Pres.: William A. Allen, Jr., '27
V. Pres.: Thomas E. Young, '52
Sec.-Treas.: T. E. Young, '52
1201 8th Ave., New York 21, N. Y.

Chemical resistant equipment.

YUCATAN
Distributor
For Mines—Mills—Industrial Plants—Chemical resistant equipment.
Mines Alumni Urged to Attend Homecoming, Oct. 28-29

Every alumni has been mailed a letter announcing Homecoming activities, Oct. 28-29, at the Colorado School of Mines. The letter is a Mines Homecoming card which alumni are urged to fill out and return in time for their own participation.

Complete program for the 1960 Mines Homecoming, Oct. 28-29, is as follows:

FRIDAY, OCT. 28
All Day—Golden Monument Display. 6:45 a.m.—Annual Pep Parade and Pep Rally, which we gained membership some years ago.

AMPMUS HEADLINES

DR. JAMES H. GARY

CSM Faculty and Staff Appointments Announced by Dr. John W. VanderWilt

New appointments to faculty and staff were announced recently by Dr. John W. VanderWilt, president of the Colorado School of Mines. The appointments included seven faculty members, two administrative aids, a librarian and a special, part-time lecturer.

1957

LEROY V. BOVEY, consulting geologist, has moved his headquarters from 106 E. 8th St., Ft. Worth, Texas, to 2316 E. 11th St., Farmington, N. M.

JOHN W. HOYT has joined Minera Mines, Inc., Lima, Peru, as Mining Geologist. John had been with the Peruvian American Petroleum Corp. in Lima, N. Tack.

STANLEY M. CAMERON—address unknown.

JOHN E. HOFFMAN has moved from Edgemont, S. Dak., to 4101 Bunting Ave., Grand Junction, Colorado.

GEORGE J. KIRK, consulting geologist, lives at 121 Cherry, Asp, Denver, Colorado. He was formerly with Pan American Petroleum Corp. in Humacao, N. Tack.

DONALD L. COULTHARD's address is 2316 E. 11th St., Farmington, N. M.

JOHN W. MUNN—address unknown.

JOHN E. HOFFMAN has moved from Edgemont, S. Dak., to 4101 Bunting Ave., Grand Junction, Colorado.

GIBSON B. PINKERTON—address unknown.

CHARLES BRUCE may be addressed c/o Conoco, Ltd., Calcutta, Cali.

How to Read a Mine—Part I: The Geophoto Group

George D. Voile, '35

Production & Management

President, Wheat Ridge, Colo.

Lawrence E. Smith, '31

Senior Mining Engineer

Geophoto Group

Denver, Colorado

Price List on Request.

For a complete price list of the Society's publications, send in order "Price List on Request.

Lawrence E. Smith, '31

Senior Mining Engineer

Geophoto Group

Denver, Colorado

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Senior Mining Engineer

Geophoto Group

Denver, Colorado

Price List on Request.
4:30 to 6 p.m.—Reception. Refreshments for developing Homecoming.

4- p.m.—Dedication of College Union. Col. of the past two years is substantially with perhaps a dozen more yet to reg­

9 p.m.—Homecoming Dance, 9 to 12 in the Large Ballroom of the College Union. Program will include in­

9 p.m.—Homecoming Dance, 9 to 12 in the Large Ballroom of the College Union. Tickets $3.00 per couple if purchased in advance; $7 per couple if purchased at door. Tickets may be purchased from any "M" Club member or from the Student Activities Office in the College Union.

Let's make this Homecoming a rousing success and lay the groundwork for developing Homecoming into the traditional time when Alumni come back home.

Miners Enrollment 1964

As of Sept. 29, 1960

Enrollment at the Colorado School of Mines was 1,046 on Sept. 29, 1960 with perhaps a dozen more yet to reg­

ister. This total is slightly less than last year.

The decline in enrollment may be due more to the present popularity of pure science as a career, for the same decline is found in other schools who have courses in Mineral Engineering. In fact the decline at MINES each of the past two years is substantially less than in these other colleges. As a result MINES graduated nearly 30 per cent of those receiving a degree of Engineering in the entire U.S. in 1960. A similar increase in per­

centage in the other options taught at MINES has been evident.

Of great interest to the present stu­

dent, the prospective student and to his parents is the fact that every MINES graduate in 1960, just as in the past, was placed in a job in his respective field of interest. Those graduates who were above average in their scholastic standing had a choice of more than one position. The high­

est starting salary accepted was $7,200 per month, while the overall average was $4,677.

(Editors' Note: It is my feeling that the high school senior is frequently misled by the emphasis placed upon the glamour of a scientific education, when in fact he has no idea what that may comprise. Certainly he does not have the background information needed to evaluate the opportunities in scientific field. At the same time, mineral engineering schools have failed to inform him of the opportu­
nities available in their own areas; one emphasized the fact that mineral industries engineering is frequently the practical application of technical developments and thus offers a satis­factory and exciting career in applying scientific principles to industry work.)

CSM's 1960 Mines-O-Rama Scheduled Oct. 24-Nov. 18

The Colorado School of Mines will present its 1960 MINES-O-RAMA from 9 a.m. to 4 p.m. Oct. 24 through Nov. 18 at the First Federal Savings and Loan Association building, 3460 W. 38th Ave., Denver, Colo.

On exhibition will be early Colo­nado mining methods, historical pic­tures, early mining equipment, models of working mines, petroleum engineer­ing, geological and geological ex­hibits, early and present day petro­leum refining, complete plastic model of refinery showing process from crude oil to refined gasoline, metallurgical display, and minerals display.

Mines vs. Oakland Oct. 2

The newly formed Denver Broncos of the American Football League opened their first home season game Oct. 2 against Oakland in Bears Sta­

dium. They returned from their road trip with a two to one standing after losing a heartbreaker to New York. The professional football team spent part of the summer months drilling at the Colorado School of Mines. (See p. 22, August 1960 MINES Magazine.)

Broncos vs. Oakland Oct. 2

The newly formed Denver Broncos of the American Football League opened their first home season game Oct. 2 against Oakland in Bears Sta­
dium. They returned from their road trip with a two to one standing after losing a heartbreaker to New York. The professional football team spent part of the summer months drilling at the Colorado School of Mines. (See p. 22, August 1960 MINES Magazine.)

CSM Faculty Members Earn Academic Promotions

Academic rank promotions for six Colorado School of Mines faculty members were announced in August by Dr. Truman H. Kuhn, dean of facul­

ty.

Dr. John R. Hayes was raised to full professor of geology. Rised to the rank of associate professor were Dr. Frank S. Mathews in physics, Dr. Malcolm E. Collier, a 1922 mining engineer, in English, and Dr. John R. Hayes was raised to full professor of geology. Rised to the rank of associate professor were Dr. Frank S. Mathews in physics, Dr. Malcolm E. Collier, a 1922 mining engineer, in English, and Dr. John R. Hayes was raised to full professor of geology. Rised to the rank of associate professor were Dr. Frank S. Mathews in physics, Dr. Malcolm E. Collier, a 1922 mining engineer, in English, and Dr. John R. Hayes was raised to full professor of geology. Rised to the rank of associate professor were Dr. Frank S. Mathews in physics, Dr. Malcolm E. Collier, a 1922 mining engineer, in English, and Dr. John R. Hayes was raised to full professor of geology. Rised to the rank of associate professor were Dr. Frank S. Mathews in physics, Dr. Malcolm E. 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All professional advancements at Mines are made on an individual quality teaching basis. The School (Continued on page 92)
CLASS NOTES

(Continued from page 88)

Lt. DAVID J. DUNN is now serving his active duty as a metallurgist for the Army Reactor Group, Fort Belvoir, Va., with duty station at A.E.C., Germantown, Md. He writes that he works in civilian clothes and only realizes he's a lieutenant on paydays.

PAUL J. HERBERT is process engineer, Atomic Power Equipment Department, General Electric Co. His address is 418 Dover Way, San Jose, Calif.

RONALD D. KOEHLER's address is P. O. Box 3507, Dallas 35, Texas.

LARRY K. LEPLEY—address unknown.

JAMES M. LINK, who was living in Puerto Armuelles, Panama, has returned to the United States where his address is 140 Northridge Lane, Woodside, Calif.

DALE D. NEWTON—address unknown.

JERRY D. RICHARDS, highway engineer for the U. S. Forest Service, lives at 1030 J Street, Eureka, Calif.

DOUGLAS M. ROSS is civil engineer, Los Angeles County Flood Control. His home address is 601 N. Chandler, Apt. H., Monterey, Calif.

EDWIN H. CRABTREE, III, who was living in Puerto Armuelles, Panama, has returned to the United States where his address is 140 Northridge Lane, Woodside, Calif.

RICHARD E. MILLER's new address is 6250 N. Federal Blvd., Box 5, Denver 21, Colo.

MICHAEL R. SARGENT has moved from Denver, Colo., to 1612 E. 12th St., Tulsa, Okla.

If you have any news items or information about those alumni listed as "addresses unknown", write us at once.

Mines Magazine
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