Featuring—

- Selective Preparation of Coal
- Sweetening Up the Crude
- Engineering College of University of Wyoming
- Mining in Mexico
- Controlling the Dermatitis Hazard in Mining
- 50th Anniversary of Bureau of Mines
- Oil Show Comes to Colorado
- Mineral Engineering Education for the Future
- Theoretical Approach to Friction
- Replacement Problems of Modern Equipment Management
JOSEPH McNEILL, '28, formerly of Alameda, Calif., has left there moved from Gladwyne, Pa., to Brockway N.Y.

JACK C. BALLAGH, '10, has moved from La Jolla, Calif. to 210 Carillon Drive, Houston 1, Texas.

FRANK R. HOLLENBACK, '32, may have moved from Arcadia, Calif., to 569 N. Rossmore, Los Angeles 5, Calif.

K. C. FOTCADE, '36, has left Kikegati, Uganda, Africa, has left there moved from Sonora, Mexico, to 7025 N. Fountain, Wichita 8, Kans.

D. J. FRITZ, 19, may have moved from Bartlesville, Okla., to 8520 Pershing Ave., Los Angeles 12, Calif.

J. J. G. CUNNINGHAM, '47, drill- ing engineer for American Overseas Petroleum, Ltd., has been transferred from Manilla, Philippines, to Trujillo, Libya, where he may be addressed c/o Amoseas, Box 18, Trujillo, Libya.

EDWARD W. BROWN, '20, is on a temporary assignment in Europe for Stearns-Roger Manufacturing Co.

J. H. AUVIL has asked to have his mailing address as 5531 North Ave., Carmichael, Calif. He was living in Sacramento, Calif. He now lives in Niagara Falls, N.Y.

JOE H. FREDERICKO, '51, is living at 4129 Hildring Drive, West Fort Worth, Texas.

JAMES R. DANIELS, '31, lives at 115 Paseo San Andres, Tucson, Ariz.

GEORGE E. BROWN, 22, is a member of Chi Eta, students at 2900 Brighton Blvd., Denver 26, Colo.

GEORGE R. KING, '42, is in the Geology Department, Management and Engineering Training for Convair—A division of General Dynamics Corp.

WILLIAM H. PRATER, JR., 19, has moved from Casper, Wyo., to 760 Birch Dura., Golden, Colo.

LAWRENCE E. BARRETT, '24, lives at 100 W. 5th St., Williston, N. Dak. JOHN D. STODD, 19, has returned to the United States from Bogota, Colombia. His new address is 4211 Jose Ave., Oakland, Calif.

DONALD W. DUNN, 21, has been transferred from Findlay, Ohio, to Bartlesville, Okla., and is now assigned to the Office of In- dustrial Engineer, American Independent Oil Co., lives at 1507 Aider Ave., Richland, Wash.

LAWRENCE S. BOYERS, '50, is the Vice President of the Sun Drilling Company, 148 Hawthorne Ave., Glen Ridge, N. J.

EDGAR W. DAVIS, JR., metallurgist for American Independent Oil Co., lives at 5-4878 Alpino Drive, Golden, Colo.

ALAN M. BIEBER, 19, has moved from Billings, Mont, to 2501 Datura, Littleton, Colo.

MORSE BROS. MACHINERY
2900 BRIGHTON BLVD.
DENVER, COLORADO

EUGENE D. DAWSON, '38
American Independent Oil Co.
Houston 1, Texas.

RICHARD FULTON, '40, has moved from Casper, Wyo., to 5531 North Ave., Carmichael, Calif.

DOMINGO MORENO, 19, has moved from Panama City, Fla., to 1102 W. 5th St., Williston, N. Dak.

PETER A. MACQUEEN, '50, is geophysicist. Exploration Department, Gulf Oil Corp., lives at 1102 W. 5th St., Williston, N. Dak. His home address is 4129 Hildring Drive, West Fort Worth, Texas.

HARRY D. BALL, 21, has moved from Elliot Lake, Ont. to Remer, British Columbia, Canada.

FREDERICK C. ALDRICH, 19, has moved to 1931-40
2900 BRIGHTON BLVD.
DENVER, COLORADO

PITT W. HYDE, '22, has changed his address as 5531 North Ave., Carmichael, Calif. He now lives at 115 Paseo San Andres, Tucson, Ariz.

GEORGE W. KING, '42, is on a temporary assignment in Europe for Stearns-Roger Manufacturing Co.

W. W. CLINE, Ex-'29
Brown & Root, Inc.
327 First National Bank Building
Houston, Tex.

DOMINGO MORENO, 19, has moved from Panama City, Fla., to 1102 W. 5th St., Williston, N. Dak.

BROWN & ROOT, INC.
P. O. Box—Construction, Weather, Tex.
3002 West Third, Denver 10, Colo.

H. J. RUTHERFORD
Mining and Metallurgical Division
The University of Texas
Austin, Texas.

EDWARD W. BROWN, '20, is on a temporary assignment in Europe for Stearns-Roger Manufacturing Co.

EUGENE K. EYKROK has moved from Venice, Los Angeles 6, to 6210 Brunswick Co., New Orleans 14, La.
Make your mine openings self-supporting with CF&I Rock Bolts

CF&I Rock Bolts reduce the need for costly and clumsy mine timbering. Mine openings may be smaller or the space saved will allow forer, more efficient movement of machinery. Ventilation is improved, too.

But most important, CF&I Rock Bolts with the Pattin Shell provide safe and sure support for walls and roofs. The double expansion of the Pattin Shells makes continuous contact along the entire length of the shell. You get maximum anchorage in any type of rock. The Pattin design also provides maximum resistance to load with minimum displacement of the shell. Mine records have shown that the use of CF&I Rock Bolts with lagging of Realock Metallic Fabric results in cost savings of about 35% over timbering. For complete information on threads, diameters, lengths, price and delivery, contact your local CF&I sales office.

CF&I also makes a complete line of 1" Wedge Type Rock Bolts, as well as expansion type slusher pins.
Susquehonna to Explore Canadian Mining Property

The Susquehonna Corp., Chicago recently announced that it has entered into option agreements with Rainier Gold Mines, Ltd., of Toronto, to conduct explorations of Rainier's Canadian mining properties.

Rainier's option consists of deposits of gold, silver, lead, zinc, and minor amounts of copper, platinum, and palladium, and are located near Revelstoke, British Columbia.

Susquehonna will conduct Canadian operations through a wholly owned subsidiary, Susquehonna Metals Ltd., Alton D. Gray, president of the newly formed subsidiary, reports the company has executed an option-lease with Rainier, and has commenced a program of exploration and ore testing, together with a feasibility study of metallurgical treatment methods.

According to Gray, Susquehonna will only exercise its option if sufficient ore is proven to support a integrated mining and milling operation.

In the United States, Susquehonna owns three uranium ore processing plants and several mining properties.

The company also is engaged in the manufacturing of electronic, and transportation fields.

Open-Pit Uranium Mine

In Shirley Basin Area

Stripping operations for a new open-pit uranium mine in the Shirley Basin area about 60 miles south of Casper, Wyo., are being conducted by Plateau Construction Co. of Rawlins, Wyo., President Roy L. Robertson, reports the ore, scheduled to begin production is estimated to contain 110,000,000 pounds of recoverable uranium.

Kennecott Electrolytic Copper Refinery Dedicated

Kennecott Refining Corp.'s $10,000,000 electrolytic copper refinery, newest and most modern in the copper industry—was dedicated recently at Hawk Point, Mo., in a ceremony attended by about 1500 people representing mining company officials, government officials, domestic and foreign buyers and dealers.

Milling Record Proposes Program to Aid Mining Industry

Mining Record proposes a program to aid the mining industry to receive and restore the domestic mining industry as a vital and dynamic factor in the national economy. The program was introduced by The Mining Record, Mining Exchange Bldg., Denver 2, Colo.

The Mining Record program would (1) repeal laws which prohibit the general public from acquiring, owning, or disposing of newly mined gold. (2) abolish all agencies of the federal government having custody of gold and silver owned by the United States, free selling silver for gold or silver for commercial, industrial, or artistic purposes, and that such gold and silver be devoted solely to bona fide monetary transactions; and (3) establish a national system whereby each foreign country producing metals or minerals in competition with domestic mines would have a quota or amount which could be shipped into this country each year, and that the yearly total of all such quotas for each metal or mineral shall be so limited as to guarantee the stability and profitable operation of domestic producing base metals and minerals.

In support of the program, an editorial in the July 7, 1960 issue of The Mining Record points out that its following advantages:

(1) Its proposals to solve the metal mining problems are simple, short, and possible of attainment.

(2) The program avoids two of the standard arguments against increasing the price of gold. It does not change the official price of $35 an ounce for gold, which is required by the 1934 Gold Reserve Act and is used by the U.S. and its agencies in monetary transactions. It will not raise the value of all Soviet gold stocks because it makes no change in the official price of gold. This country now lacks approximately one-third of the gold necessary to meet its foreign obligations and preserve requirements in bull. As for silver, the demand exceeds production by about 100 million ounces. Prices of gold and silver would rise considerably in both domestic and world markets if the practice of the U.S. Mint in selling these metals for commercial, industrial and artistic purposes were to profit more than their costs of production should be terminated.

(3) Import quotas have worked successfully for years in the case of sugar. Thirty years ago U.S. sugar producers were facing the same situation as do now the producers of copper, lead, zinc, uranium, manganite, fluorite, and other base metals and minerals. The Sugar Act gave other sugar-producing nations specific quotas or amounts of sugar each country could sell in the country each year—40 per cent of U.S. sugar being supplied by foreign countries, 60 per cent by U.S. producers. As a result, the U.S. sugar industry today is fairly prosperous—so much so that a similar program was recently adopted for wool.

(4) The program is something the newspapers, the public, and the congressmen and senators really want and appreciate. It will not cost the taxpayer one penny. On the contrary, it may show the prices our federal government has placed upon gold and silver are too low, and it needs to put it into effect is favorable action by Congress.

-Mining Record
Susquehanna to Explore Canadian Mining Property

Radioactive gold, silver, lead, zinc, and recently announced that it has entered small amounts of copper - and cadmium operations through a wholly owned subsidiary, Susquehanna Met-

The company also is engaged in the development of uranium and other fields.

According to Grey, Susquehanna will only exercise its option if sufficient ore is proven to support an integrated mining and milling operation. In the United States, Susquehanna operates twelve mines - processing plants and several mining properties. The company also is engaged in the development of uranium and other fields.

Open-Pit Uranium Mine in Shirley Basin Area

Mining Legislation Introduce in Congress

Mining Legislation Introduced in Congress

The National Fuse & Powder Co.

Kellogg Exploration Company

Robert F. Garland, '52

GRAY-COHRRINE CO.

John B. Gray, '52

Independent Geologist

The Mining Record, Denver, Colo.

217 City Center Bldg. Casper, Wyo.

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Committee Studies Education Of Nuclear Engineer

A trail-blazing study on the education of nuclear engineers was begun in May under a contract from the Atomic Energy Commission and the American Society of Mechanical Engineers, jointly by the American Society for Engineering Education and the American Nuclear Society. A committee of engineering educators is charged with gathering data on educational programs for nuclear engineers. The committee's work is expected to take at least a year, according to Mr. Murphy, where it stands, and the direction it takes.

Chairman of the study committee is Dr. L. L. Lillibridge, head of the department of nuclear engineering at Iowa State University in Ames. In announcing the AEC grant, Dr. Murphy said: "There is too little education in the professional engineering education in the field of nuclear energy. If the nuclear energy program is to grow to maturity, it is essential that the educational programs be kept up to date."

The study will be coordinated with other educational efforts in the field of nuclear energy, particularly by the Nuclear Science and Technology Division of the American Institute of Physics, and the Nuclear Science Council of the AEC.

The study of the educational programs will be aimed at determining the needs for nuclear engineering education, and at recommending the steps that should be taken to meet these needs. The study will be conducted by a team of experts in the field of nuclear engineering education, and will be supervised by Dr. Murphy.

The study will be conducted in two phases. In the first phase, the study will be conducted by a team of experts in the field of nuclear engineering education, and will be supervised by Dr. Murphy. In the second phase, the study will be conducted by a team of experts in the field of nuclear engineering education, and will be supervised by Dr. Murphy.

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Preparation of Coal

By DR. PARKE O. YINGST, ’30

There are many problems in mining that are common to both coal and hard rock mining. To be sure, these problems vary in detail, but drilling, blasting, loading, and transport are all common problems.

In order to understand the problems of selective preparation of coal, we must first understand the composition of the coal. Most coals are made of different minerals. A particular ore may be predominantly composed of carbon, but this is not always the case. The composition of the coal will vary greatly from one type to another.

For example, you can go into a coal mine and find that it is composed of mostly carbon, and others quite low; that some are high in volatile matter and some do not; that some are high in fixed carbon and others are not.

We generally think of coal as being homogeneous. This is far from true. Just as rocks are made of different mineral components, coal is also made of different mineral components. We can often see these components in the coal itself.

The recovery of coal and separation of the first class of waste material is very easy in that there is ample difference in the specific gravities of the coal and waste to permit gravity separation at relatively coarse sizes.

Recovery of coal and separation of the second class of waste material is dependent upon the reduction of the coal to a size that will liberate the material. Once liberated, this class of material can be separated by conventional methods because of the gravity difference between the coal and the waste material.

The third class of waste material cannot be recovered by conventional methods because of its extremely fine size and distribution. The extent to which the ash content of a given coal can be reduced by conventional milling or preparation methods is therefore limited.

We can analyze for carbon, hydrogen, oxygen, and other elements, but we do not know the exact form in which these elements are combined. We do know that certain hydrocarbon compounds are found in coal. But the distribution of these compounds changes with each gradational change in rank, from subbituminous, through the bituminous ranks to anthracite.

In mining or concentrating an ore, we are generally faced with the problem of recovering a small amount of valuable material, percentage-wise, from a large amount of waste material. In coal preparation, the problem is reversed in that the valuable portion constitutes the bulk of the material treated.

In ore milling the valuable material is generally distinct and pure in itself. If the mineral is separated from the waste material it is usually of good grade.

Waste Material in Coal

The waste material in coal, broadly speaking, occurs in three different forms. First, there is the coarse rock that may present as: a) a case calling for special preparation.

In ore milling the valuable material is usually of good grade, but in coal preparation, we have to recover a second product with 10 per cent ash content, and then a third product with 10 per cent ash content.

The remainder containing 20 to 25 per cent ash is used as fuel. This is acceptable to a less demanding customer at a slightly reduced price. Now the remaining 20 to 25 per cent, containing 25 per cent ash, is used as fuel. This is acceptable to a less demanding customer at a slightly reduced price.

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Consequently, the final product will consist of these three products and is able to market all of his mine run. Without preparation his mine run was acceptable to only one customer.

This example deals with a coal in which the ash is the critical factor. There are other coals with different types of problems. In treating an ore we concentrate the ore, but in coal preparation we recover a valuable product from a certain amount of waste material present in the coal. This may be as low as 0.5 per cent but usually ranges from 2 to 5 per cent.

THE AUTHOR

Dr. Parke O. Yingst holds these degrees from the Colorado School of Mines: B.S. in 1930, M.Sc. in 1951, and D.Sc. in 1960.

After receiving his M.E. degree from Mines, he was employed for three years in the Safety Division of the U.S. Bureau of Mines in the coal regions of Pennsylvania, Alabama, Virginia, and Kentucky. From 1933 to 1945, Dr. Yingst was employed in the mining of Colorado, California, and Venezuela. From 1945 to 1946, he was with the Corps of Engineers, and from 1949 to 1953 he served as an instructor in mining at the Colorado School of Mines. Since 1953 he has been project engineer, CSM Research Foundation, Inc. Dr. Yingst has specialized in the application of mineral beneficiation methods to the physical improvement of coals.

PHYSICAL AND CHEMICAL COMPOSITION OF COAL

Now what about coal? We know that some coals are very hard and others soft; that some coals coke and some do not; that some are high in volatile matter and others quite low; that some are easy to ignite and others very difficult.

We know these macerals have different physical properties, such as hardness, specific gravity, color, and structure. These properties can be observed and measured. As for the chemical composition, we have only been able to determine it in a general way. We can analyze for carbon, hydrogen, oxygen, and other elements, but we do not know the exact form in which these elements are combined. We do know that certain hydrocarbon compounds are found in coal. But the distribution of these compounds changes with each gradational change in rank, from subbituminous, through the bituminous ranks to anthracite.

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Waste Material in Coal

The waste material in coal, broadly speaking, occurs in three different forms. First, there is the coarse rock that may present as: a) a case calling for special preparation.

In ore milling the valuable material is usually of good grade, but in coal preparation, we have to recover a second product with 10 per cent ash content, and then a third product with 10 per cent ash content.

The remainder containing 20 to 25 per cent ash is used as fuel. This is acceptable to a less demanding customer at a slightly reduced price. Now the remaining 20 to 25 per cent, containing 25 per cent ash, is used as fuel. This is acceptable to a less demanding customer at a slightly reduced price.

The product with 10 per cent ash is used as fuel. This is acceptable to a less demanding customer at a slightly reduced price. Now the remaining 20 to 25 per cent, containing 25 per cent ash, is used as fuel. This is acceptable to a less demanding customer at a slightly reduced price.

Consequently, the final product will consist of these three products and is able to market all of his mine run. Without preparation his mine run was acceptable to only one customer.

This example deals with a coal in which the ash is the critical factor. There are other coals with different types of problems. In treating an ore we concentrate the ore, but in coal preparation we recover a valuable product from a certain amount of waste material present in the coal. This may be as low as 0.5 per cent but usually ranges from 2 to 5 per cent.
The selective separation of coal was investigated by both flotation and gravity separation. Only the results of gravity separation tests will be discussed in this paper.

Samples of mine run product were obtained from a number of mines operating in the different coal fields of Colorado. Those included both coking and non-coking coals.

**Gravity Separation Tests**

The procedure for these tests was, briefly:

1. The samples were stage crushed to minus 6-mesh. The stage crushing avoided the production of an excessive amount of fines. The crushed material was thoroughly mixed and then a head sample was cut from it. The remainder was used in the test.

2. The material was separated into fractions of different specific gravities. The point at which the separation was started was determined by experiment. A portion was placed in a beaker with heavy liquid. This was usually of about 1.22 specific gravity. The specific gravity was gradually increased until a small amount of float material was obtained. With this specific gravity as the starting point, separations were then made in steps with an increase of about 0.5 in the specific gravity for each increment.

3. The separations were made in a mixture of gasoline and carbon tetrachloride. This mixture can be adjusted to as high as 1.50 specific gravity. If it was found necessary to go higher, tetrabromide was substituted for the tetrachloride. The mechanics of the separation are very simple. The material is agitated thoroughly in the heavy liquid and then permitted to settle. The float materials are skimmed off, using a ladle with a 100-mesh screen bottom. When all the float is removed, the sink material is filtered and the heavy liquid adjusted to the next higher specific gravity. This was continued, taking off the various float fractions, until the sink fraction had been reduced to about 5 per cent of the original sample.

4. The individual fractions were then thoroughly air dried and weighed. Each fraction was split into two portions. One portion was pulverized for analytical purposes and the other retained at the coarse size for petrographic purposes.

5. The analytical determinations were made according to the rules of the American Society for Testing Materials. Those included the moisture, ash, volatile matter, and fixed carbon. The volatile matter and ash conversions were corrected to a moisture-ash-free basis.

**Petrographic Studies**

Petrographic studies were made on polished fine-grained mounts of the coal fractions. Those were made using a special wax mixture. The studies were made at 50x using unpolarized light. The petrographic components were estimated in each field of view and a consecutive three traverses across the polished block—were examined on each block. Those estimates were averaged and the average taken as the analysis.

The petrographic analysis indicates whether there has been much segregation of the various macerals in any particular gravity fraction. Those different macerals have different specific chemical compositions which are summarized in the proximate analysis, i.e., the concentration of either of the macerals is low in the original coal material. The petrographic analysis reveals the extent of the concentration of the macerals better than the volatile matter/fixed carbon ratio.

Another fact of importance is that in coking coals the vitrain index is low and the fusinite does not coke. Other macerals also affect the coking properties, some improve it while others do not. For example, exinite, which is usually a minor component, increases the plastic properties, but it also tends to increase the shrinkage of the final coke.

**Results Summarized**

To summarize the results, I have prepared three plates to show the effect of selective gravity separation with respect to recovery, ash content, and the concentration of the macerals. The macerals are shown as three principal types. Vitrain contains all the macerals with coking and high volatile characteristics and includes vitrinite, resinite, and exinite. Fusinite contains only fusinite and the fillings within the cell cavities of the vitrain. Inertinite contains the inert macerals, other than fusinite, and includes semifusinite and micronite.

Plate I shows the results obtained with a coal of rather low ash. The original coal showed no coking properties. The light fractions, representing almost 85 per cent of the original, contained only 1 per cent ash and had slight coking properties. This low ash coal is a possible source of electrode carbon. The heavier fractions in this separation all represent good usable fuel.

Plate II shows the results of a high ash coal in which there is apparently no distinct change in the ash content with increasing specific gravity. It is not possible to obtain a real low ash product but it is possible to obtain a high ash reject. In preparing this coal the operator is guided by both the washability curve and the market. He must maintain as high an ash content as the market will stand in order to obtain as high a recovery as possible. The high ash reject with this coal is strictly refuse.

Plate III shows the results obtained from a weakly coking coal with a fairly high ash content. This coal exhibits low plastic properties, having a Gieseler rating of about 10. The 1.26 specific gravity float has a Gieseler rating of about 70. The 1.26 sink has a Gieseler rating of about 12. The example indicates how selective preparation can produce fractions of differing coking properties.

In hope the brief summary of work done on the selective gravity preparation of coal has shown the similarity of problems facing the coal and metal mining industry. Although the experimental work is a little premature, but as I see the picture, the selective gravity preparation of coal will be of increasing importance in the near future. Perhaps this work will point the way to future developments.

(Filler’s Note: Under Plant News is a short article on the beneficiaton of coal by froth flotation, rather than by gravity treatment.)
The main job of the big oil "kitchen" at Abqaiq, Saudi Arabia is

Sweetening Up the Crude*

Among the petroleum installations at Abqaiq, Saudi Arabia, is a big processing plant known as a crude-oil stabilizer, and, figuratively speaking, you might say that its main job is to get rid of the "rotten eggs."

"Rotten eggs" means hydrogen sulfide gas (H₂S) — they share a common odor. If you've ever cracked an egg into an omelet, you'll get the idea. This gas is contained in the crude oil as it comes from the wells. It not only has a vile odor, it's also poisonous — it can kill you if you inhale it. And it's corrosive. If the crude is "wet"—that is, if it contains water—the H₂S and the H₂O will react to form H₂SO₄ — sulfuric acid, a heavy oily liquid that can eat its way through a steel pipeline or storage tank.

Hydrogen sulfide has to go. And one of the Aramco plants that does this job at Abqaiq is the world's largest crude-oil stabilizer: it can process up to 950,000 barrels of crude daily. That's equal to 39,000,000 gallons—a pretty fair batch in anybody's kitchen.

The stabilization process—basically a form of partial distillation—does two jobs at the same time: it sweetens "sour" crude oil (removes the hydrogen sulfide) and reduces vapor pressure, thereby making the crude safe for shipment in tankers. Vapor pressure is exerted by light hydrocarbons, such as methane, ethane, propane, and butane, changing from liquid to gas as the pressure on the crude is lowered. If a sufficient amount of these light hydrocarbons is removed, the vapor pressure becomes satisfactory for shipment at approximately atmospheric pressure.

All the crude produced in Saudi Arabia—except for that of the offshore Safaniya Field in the Persian Gulf—is "sour." At ground level the pressure may be as high as 1,600 pounds per square inch (or "1,600 psi," as the engineers say). It must be reduced considerably before it reaches the stabilizer, so it's sent first to a gas-oil separator plant, or "GOSP." There are eleven of these in the Abqaiq area.

Now, the gas can't be allowed to "blow off" all at once. If it did, a considerable amount of liquid would also be lost—something like shaking a bottle of soda pop before uncapping it.

The gas is released in stages in a series of drums or columns, known as separators, before it reaches a spherical where the pressure is cut down to about 2 psi. By now, most of the light hydrocarbon gases have been removed, but the gas is still "sour." The next step is to pump it to the sour-crude storage tanks at the stabilizer to await processing.

Booster pumps push the oil from the storage tanks to the top of one of the stabilizer columns. It enters the column and starts to flow down through a series of "bubble trays." Near the bottom, the down-flowing oil is channeled to a reboiler that heats it. By the time it reaches the bottom section of the stabilizing column, it's hot. Gases contained in the crude—both hydrogen sulfide and light hydrocarbons—begin to boil off at this temperature. They rise to the top, while the heavy crude remains at the bottom.

The rising gases, incidentally, perform a useful function on their way up the column. Being hot, they supply preliminary heating to the incoming sour crude, and also "strip out" some of the gases contained in it.

When the hot gases leave the column, they're piped to what's known as a "scrubber." Its purpose is to recover most of the liquid hydrocarbons contained in

* Reprinted from the Arabian World, a publication of the Arabian-American Oil Co.

(Continued on page 19)
A Brief History of the University of Wyoming

The University of Wyoming, established in 1887 with a faculty of seven, had a rather ambitious program. Degrees were to be granted in six departments: Liberal Arts, Philosophy, Letters, General Science, Fine Arts and Practical Arts. Included in the Practical Arts were mining, metallurgy and engineering, all taught by a one-man department at a salary of $1500 per year.

The first revision of the curricula appeared probably in 1889 or 1890 and included the school of irrigation engineering and the school of mining.

It is interesting to note that Cecil Rhodes attended one of the first summer sessions held at the University of Wyoming and from the interest gained here established the Rhodes Scholarships at Oxford University. The 1909 catalogue showed three colleges: Agriculture, Engineering, and Liberal Arts. This was the first indication of a separation of agriculture and engineering. In 1908 a professor in Civil Engineering was employed and specialized courses started.

R. A. Morgan, who received an R.M. degree in 1929 and a M.S. in 1933 from the Colorado School of Mines, was recently named assistant dean of the UW College of Engineering. He also heads the Department of General Engineering and Engineering Drawing.

Mineralized as the state of Durango—without presentations of General Engineering and Engineering Drawing—has been the most important factor in the growth of the college. During this period the new school of mining has been growing and its achievements have been significant.

In the last few years, the school of mining has made a remarkable progress. In 1927 the Engineering Building was completed and is at present the new home of the college. The building has a capacity for about 1500 students and faculty. The college is now ready to take its place among the leading engineering schools in the country.

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In Mexico's state of Durango, located in the north-central mountainous portion of the country, a number of tremendous deposits of pyrite have been discovered. These deposits have made the producers huge fortunes, yet figuratively speaking, the surface has only just been scratched. No area could be so highly mineralized as the state of Durango—without presenting untold advantages to the men who intelligently undertake its exploration.

Although no "miracle" things over my doorway yet, people from all walks of life have wandered into my office in the city of Durango, to talk about mining. Durango, the capital of the state, is the focal point of the state's mining interests. Few of the people who called upon me were versed in Mexican mining laws or knew how to go about acquiring mining titles or concessions for exploration and development. The prime step for all people is to observe carefully Mexico's mining laws and never attempt to circumvent them.

In almost every instance, people have asked questions about the mercury prospects in the state, about copper and molybdenum, and about the prospects of reopening old Spanish gold and silver mines. None of these are far-fetched rumors about Durango's famous "Iron Mountain." "Iron Mountain," just outside the city of Durango, is a prominent and an unusual sight and can be seen from almost any point in the city. It has a habit of stimulating the imagination and has become one of Mexico's mining monuments. It has an interesting history.

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Cerro de Merado Discovered in 1522

This mountainous range was discovered in 1522 by Captain Alonso Vasquez de Merado and named after him. "Cerro de Merado," one of the greatest of Spanish explorers, Captain Merado's main objective was to seek and recover gold. He had no idea in those early days of the importance of iron to the industries of today. On painstaking examination, he was horrified to find that his mountain was totally iron ore without a sign of gold. In chagrín at his disappo-
Charities, is held in affection and esteem by the people of Durango.

Captain Gines Vasquez de Mercado, in the same year of 1552 that he discovered the Iron Mountain, traveled north and discovered the silver deposits of San Lucas and those of San Juan Del Rio, about 55 miles due north of the present city of Durango. Finding but little gold with the silver, these deposits did not interest him, so he proceeded another 30 miles north in search of gold on the "Camel-Back" of Coneto. At a point near the north end of this "Camel-Back" where outcrops of a cross-vein occurred, he sank a test pit some 20 feet deep and began to encounter ore that ran 100 grams of gold per ton. He was so elated with his discovery that he left a portion of his soldiers in Coneto and traveled south with a few soldiers through Durango to visit his wife in Guadalajara. He reported his silver discoveries in the area of San Lucas and the more important discovery of gold on the "Camel-Back" of Coneto, as he stopped over briefly with the Durango garrison. Unfortunately, enroute to Guadalajara, his small party was attacked by unfriendly Indians. He was so severely wounded that he died before reaching Guadalajara.

Ibarra Opened Up Gold Production

It was Capt. Francisco de Ibarra, therefore, who in 1556 opened up the gold production on the "Mercado Camel-Back." He started at the north end of the camel-back where Captain Mercado had sunk his test pit—and followed down the vein's enriched structure. He named this the Number One Mine, but later called it the San Miguel Mine. He developed seven gold and silver mines along the two miles of the Camel-Back, num­bering them in sequence from north to south. From the old Church records, his Number One Mine was richer in gold than all the others so much detail was written about it. No. 1 opened many gold-pockets and five large enough to be recorded that some of the gold nuggets found were as large as chicken’s eggs. He completed building his Hacienda in the year of 1589 and installed a "mint" in it in 1560. He minted his first gold coins in the realm of Spain in his Coneto Hacienda during the year of 1560. The old Hacienda is still in existence. The Church history recites that over a long period of years he shipped a large volume of gold coins from his Coneto Mini to his residence depot in the city of Durango.

There being no economical method in those early days of recovering gold or silver from their sulfides, the Spaniards were forced to abandon each of the Camel-Back mines as production for the rich sulfides. Gold and Silver Recovered from Sulfides

It was not until about the year of 1900 that a German-owned smelter of Monterrey began to use an economical method of recovering gold and silver from the sulfides. Subsequently, a few courageous men with some money reopened the No. 1, No. 5 and No. 6 mines of the Mercado Camel-Back. Between the years of 1900 and 1911 they produced ore with marked success and substantial profit. However the activities of Pablo Villa caused them to shut down the mines. None of those mines have been reopened since, but certain exploration work was done on the No. 1, in 1956, which was opened to the 200-foot level, but not to the reportedly rich cross-vein at the 350-foot level.

(Edited's Note: In the September issue, Mr. Parlia­ment's article will discuss mercury and silver deposits, the Mexican Mining Commission, and mining possibilities in the Durango area.)

SWEETENING UP THE CRUDE

(Continued from page 15)

The stabilized crude oil goes on to the cooling unit, where enormous fans reduce the temperature. Why? Because if the oil remained warm, all the lighter frac­tions of crude oil would evaporate. The cooler the oil, the more stable it is.

A 300,000 barrel capacity ran 950,000 barrels of crude oil daily in summer, but only about 800,000 daily in winter. Most crude oil has some water in it when it comes from the reservoir. In warm weather the water vaporizes easily and is taken off at the gas-oil separator before stabilization. But in cold weather it remains in the crude that is pumped to the stabilizer and causes "foaming," which reduces the efficiency of the process. "Foaming" is similar to the action that occurs when you shake oil and vinegar to make a salad dressing. Ordinarily the oil floats free above the vinegar, but when shaking together produces a bubbly emulsion, a frothy mixture that will not separate for quite a while.

Sour crude oil is heated in the bruntails vessels to "boil off" the hydrogen sulfide and light hydrocarbons.

As in other modern oil-processing installations, practically everything is operated automatically from the control room. There are only five men on each shift: a head operator and four assistants, all Saudis.

By the time the stabilizer has finished its job, the hydrogen sulfide that was in the oil has been almost entirely removed—reduced to an infinitesimal ten parts per million.
Controlling The Dermatitis Hazard

In Mining

By E. A. PIERSALL

Underground mining probably presents one of the greatest potential dermatitis problems in industry today. We say this because we have been through a rough siege with it, and now have it licked. Controlling the incidence and spread of this disabling and costly occupational disease has been accomplished largely through a coordinated program of employee education in cleanliness. For a major part of the success of our program, we can thank the Association of American Soap & Glycerine Producers, Inc., which provided us with the communications tools including an effective flipchart for use at safety meetings, that have helped sell our men on maintaining higher cleanliness standards.

Program of Education

The Association's research showed us that if we followed a definite plan of educating our miners and underground workers by telling them to wash more frequently; change work clothes more often and keep these clean; and report immediately any sign of rash, itch or redness of the skin—we could nip potential skin troubles in the bud. This program of communications—ever including underground health and safety meetings—supplemented the company's long-established routine of requiring the men to wear oil greases used in drilling equipment and other mechanical devices; explosives, and to a certain extent, solvents. Mechanical and physical factors, such as friction and cold are present too. The temperature underground may average around 40 degrees, and it is damp. Humidity will run from 90 to 95 per cent. At the mill, which is a combination mechanical and chemical plant, various chemicals, oils, heat and fine rock particles are encountered daily. About 120 men are employed at the mine, and there are up to 130 at the mill.

Mining in the High Sierras does not lend itself to faucet installations for washing. In fact, it was quite a feat to install running hot water in one washup station and assembly point on the way out near the entrance. However, there are adequate facilities provided in the buildings clinging to the side of the steep mountain at the face of the mine. Our "change" or wash-up room, features complete facilities for thorough cleansing. These change rooms are in the mill and main building, and washrooms are in the garage, between the garage and the carpenter shop, and in the chemical and metallurgical lab as well as the offices.

Although our buildings are about 12 stories old, they are kept in immaculate condition. Tinfoil showers, with hot and cold running water, and several circular wash basins are provided. In the hand washing basins we provide running water and a quality hand scrubber. In the shower room, men normally bring their own hand soap, and of course they bring what they like. We do provide a waterless, amnoniated cream hand cleaner for those people who do not bring or who forget their own personal soap. We have been able to remove normal soap and water washing. This hand cleaner is used largely by our mechanical maintenance men in the garage and machine shop. In addition to being available in the washup room, the cream is also dispensed at five stations in the mine and six in and around the mill.

Points are used in the change rooms to speed drying of garments and underclothing. Our average miner normally wears a layer of clothing: long underwear, sweatshirt, maybe another shirt, over this, and on top of everything, rubber clothing. We call 'diggers.' Now we are switching from rubber to nylon suits. Also, they wear knee-length rubber boots and plastic gloves. We have felt that in addition to being lighter, nylon suits may help eliminate irritations possibly caused by rubbercontacting the skin. In one or two cases, we feel this may have had some relationship to dermatitis reports. Each man has up to 15 minutes to shower and clean up after work before catching the company bus to the mill, and then into Bishop.

Controlling Dermatitis

For several years, of course, we have carried out a safety program aimed at controlling dermatitis, which is a recognized hazard. For years we have urged the men to clean up regularly, report rashes or redness, and keep garments clean. We have had the full cooperation of the union which is as much interested in eliminating dermatitis as the men and we are. However, human nature being what it is, some men will just naturally let things slip. And this is why we feel that voluntary cooperation through an educational program is a major reason for our recent success.

The Author

E. A. Pierson grew up in Reno, Nev., and attended schools there from the first grade through the University of Nevada, where he majored in psychology, graduating in 1943. He spent the next three years in the Navy as an officer on minesweepers. After the war, he studied law for a year and worked at various construction and mining jobs. In 1950, he was hired at the Bishop operation of Union Carbide Nuclear Co. as safety engineer. Early this year he was transferred to Colorado as safety engineer for all Union Carbide Nuclear Co. mining and milling operations in Colorado, Utah and Wyoming.
On 50th Anniversary

Bureau of Mines Celebrates Accommplishments

The Federal Bureau of Mines, a leader in scientific development and conservation of the nation’s mineral resources since 1910, was 50 years old July 1, 1960.

Secretary of Interior Fred A. Seaton noted that the Bureau was created at a time when coal mining disasters were claiming the lives of many workers. He pointed out the agency’s safety research and training and its cooperative efforts with management, labor, and other federal and state agencies have been major factors leading to improved working conditions in all segments of the mineral industries.

In the ten years before the Bureau began its work in a single research laboratory on the old Arsenal grounds in Pittsburgh, Pa., coal miners died at the rate of 264 a year in major disasters. Since then, the fight carried on by the Bureau and others has reduced that yearly average disaster toll to 32, and impressive rate of 364 a year in major disasters. Since, the fight in a single research laboratory on the old Arsenal and its cooperative efforts with management, labor, and in all activities concerned with the mining and processing of minerals.

Bureau of Mines Director Marling J. Ankeny said his agency’s accomplishments are not limited to the mining field, but touch, directly or indirectly, the lives of all Americans. For example:

- Bureau produces helium—a lightweight gas that also helps lift rockets into space, and, in electronics and space exploration;
- Some hospitals in this country are still using radium to make certain nuclear medicines and have essential uses in missiles, electronics and space exploration;
- They also engineered the process now employed by industry to make zirconium metal, used in the atomic engine that powered the nuclear submarine, Nautilus, on its record-breaking run beneath the North Pole;
- Bureau investigations at San Manuel, Ariz., and “White Pine, Nautilus” provided technical advice and assistance provided by Bureau experts through the Economic Cooperation Administration.

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- Bureau investigations at San Manuel, Ariz., and “White Pine, Nautilus” provided technical advice and assistance provided by Bureau experts through the Economic Cooperation Administration.

Although many silicines in Colorado were unable to go to the May 1959 International Petroleum Exposition in Tulsa, some of them took the opportunity of visiting National Tank Co.’s big trailer-borne mobile display when it was in Denver May 2-3, in Craig May 5, and in Rangely on May 6. After leaving Colorado, the mobile display unit—featuring the identical assemblage of plastic working models which were in the Tulsa show—tour ed Utah, Wyoming, and Montana.

General purpose of the display, National says, was to promote a better understanding of the design, application and operation of National Tank produce among production men, engineers, purchasing agents, and lease operators. National Tank personnel were in attendance in the display trailer to demonstrate and explain the functions of each of the units.

Among the items in the display were:

1. A cut-away models of emulsion treaters and Lact system.
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An Analysis of the Problem
Mineral Engineering Education for the Future

By Col. Wendell W. Fertig, '51

Both the previous articles in this series drew upon the Education Symposium held at the 1960 Annual AIME Meeting held in New York City. This will be continued because of the frank and open exchange of ideas between the leaders of the mining industry and educators directly involved with the students of Mining Engineering. These two groups are as closely involved with this problem as it is possible to be. For the former, the trained mining engineering graduate is the tool by which to cure production problems and effect economic success. To the latter, the graduate is a trained product, whose success will influence the future supply of undergraduate students who, in turn, are necessary to keep the teachers of mining engineering and other educators interested in this field. Educators and industrialists are more closely involved in this partnership than ever before.

The tendency has been for each to blame the other; and in each case, the critic was acting from a base of inaccurate, or at least incomplete or insufficient information. When the industrialist undertook to criticize the educator, he was doing so to the knowledge and understanding required to be an objective critic. If he had taken the time to obtain the knowledge and understanding needed, he would have failed as an industrialist, for the reason that in our present society, one man cannot be both. He must be an expert in the field of industry or education; he cannot be competent in both simultaneously.

The curriculum needs stressed by Mr. Michaelson were reviewed by me, and the same conclusion reached. The problem of recruiting students was not so much the fault of the latter as the fault of the former. In April, the address by Charles M. Brinkerhoff, president of Western Mining Division, Noranda Mines, Canada, was discussed. In May, the other proposed range is so wide that it could not be revised when necessary, a program for students that will be satisfactory to both parties.

Education is not blameless in this matter, but industry could easily take the blame for the interested and understanding required to be an objective critic. If he had taken the time to obtain the knowledge and understanding needed, he would have failed as an industrialist, for the reason that in our present society, one man cannot be both. He must be an expert in the field of industry or education; he cannot be competent in both simultaneously.

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Mr. Michaelson said, "Our schools are not now providing the kind of training necessary to provide mining engineers with valuable preparation for effort in a highly competitive mining business." Now the student learns some generalities of mining engineering, but not the specialized technology and practice which are essential for success in the mining industry. A show of optimism, even if only a show, is the first ingredient of a successful public relations campaign.

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Theoretical Approach To Friction

A new theoretical approach to friction and valuable information on the motion of tiny imperfections of metals has been expounded by Dr. John H. Dismant, professor of mining engineering at the University of North Dakota, and by Dr. George Alers of Ford Motor Co's Scientific Laboratory.

In an article published in the January 1960 Journal of Mining and Metallurgy, Dr. Dismant presents a summary of his doctoral dissertation at the University of Utah, which involves a new theoretical approach to friction by reviving an older classical theory. It has significance in the manufacturing of additives for oils and lubricants.

Dr. Dismant writes that the original or classical theory of friction accurately considered that any surface, no matter how smooth it appears, consists of small irregularities or asperites, which could be described as hills and valleys. This older theory further considers that the force of friction as those small hills sliding over each other, then down into the valleys ready to start up a new hill, similar to sliding a sled an inclined road in a rolling ice-covered country.

Dr. Dismant points out that the surface will act like a ridge or like a solid (for example, ice) for this reason. (For example, the sled will slide on the ice.) If, however, the asperite or hill does not act like a solid but more like a liquid, then the factors governing the flowing process are the real source of friction, (for comparison, a sled in mud and what makes the mud itself flow).

Cryogenic Friction

Dr. Dismant asserts that modern studies of physics and metallurgy indicate that very small crystals (such as premicroscopic size) of metals can move through each other when put under stress and in a manner that may be considered similar to two wire brushes being rubbed together. He applies the modern knowledge of the deforming effects of metals and friction, as well as the older classical theory of friction. He believes this new approach has potential because of how similar such effects are to the behavior of all scientific fields. He has performed experiments to demonstrate that it happens in boundary-type lubrication such as when an additive is added to crankcase oil in automobiles.

Dr. Dismant points out that the older theory which he revives with the rigors of science for 20 years ago, now when these flaws tend to move about, and their motion causes bending and breaking in materials. Scientists have spent the last three decades studying the stresses that make dislocations move about and ways to slow and stop them.

Significance of Dr. Alers' Study

Dr. Dismant 's study is that he has developed a method of accurately measuring dislocation travel which has led to discovery of factors that impede this motion. In order to detect this motion, the electrical department of Ford's Scientific Laboratory had to develop equipment capable of measuring time accurately to 1/100 of a millionth of a second. Dr. Alers used high-frequency (10-million cycle) sound waves into a bar of a high purity (99.9999999999) copper. The bar had been subjected to neutron irradiation in a atomic pile by Dr. O. D. Thompson of the Oak Ridge National Laboratory, co-author of the study. Dr. Alers then measured the length of time it took to sound wave to reach the other face of the sample and also measured the amount of energy absorbed by the dislocations during the wave's journey.

In one-inch copper bar (a longer bar would have allowed the echo energy to become lost) could not be measured accurately), it was discovered that the echo energy to travel through a second. When this figure was compared with that recorded with a bar that had not been irradiated, it was found that dislocation motion had taken 3/10 of a second longer.

Measurements of the energy moving through the sample showed that the dislocations, where free to move, absorbed five times the energy that would pass through if there were no dislocations. These measurements gave accurate information on how much energy was absorbed by dislocations and their behavior at the lower ends of all scientific fields. He has performed experiments to demonstrate that it happens in boundary-type lubrication such as when an additive is added to crankcase oil in automobiles.

Dr. Dismant states that the older theory which he revives with the rigors of science for 20 years ago, now when these flaws tend to move about, and their motion causes bending and breaking in materials. Scientists have spent the last three decades studying the stresses that make dislocations move about and ways to slow and stop them.

In fields of construction and mining endeavor, equipment is a fulcrum that can determine profit or loss. It is imperative in these days of expensive financing that the administration of any business organization, utilizing such equipment, have a means of appraising the acquisition and disposal of these capital assets. In the field of construction and mining particularly the problem of controlling equipment investment is a great deal more complex than in manufacturing or other fields. This complexity is derived from the extreme variations of work duration, application and severity of working conditions. In construction and mining, although a unit may make its theoretical life, it is not unusual to be over the end of its economic life through obsolescence alone, if it were retained through long periods of idleness.

Because of such variation, the impact of income taxes, the current cost of capital investment, fluctuation in market value and other factors, decisions of feeling acquisition or disposal of equipment must be made on an individual basis. The analytical factors which should be considered before a proper solution can be reached are definable. Proper control of capital investment in typical construction or mining enterprise must consider these three general problems:

1. To obtain or rent new equipment for a new undertaking.
2. Replacement, or overhaul, of equipment which is in continuous use.
3. To replace equipment which has become obsolete.

Replacement Problem

This problem requires a decision to either purchase or rent new equipment. This decision must be made prior to bidding or negotiating new work. If the proper equipment is not in company stock, there is no choice but to obtain the new machinery required, in order to allow proper performance of the contract.

The second situation necessitates the establishment of a positive replacement program, in order to maximize profit on company stock, there is no choice but to obtain the new machinery required, in order to allow proper performance of the contract.

The third problem is the most difficult of the three to resolve. This is the situation where the construction industry constantly encounters. The problem is centered around the economics of placing machines in storage until new work is obtained, as opposed to selling the machine immediately and reinvest the amount to complete equipment rental for the new work obtained.

Let us now look into these three major problems confronting the construction and mining industry.

1. To Purchase, or Rent, New Equipment in Order to Equip A New Job

As mentioned prior, the decision to acquire new equipment for proposed work, whenever proper inactivity is not available from fleet storage, is usually made under a contract or order to equip a new job.

While the decision to purchase or rent new equipment is a complex one, it is not a problem that can be readily solved. Whether for reasons of improved productivity in new equipment, or lack of such vehicles in company stock, there is no other choice but to make the investment, unless it can be determined that outside rental would prove more economical. In general outside rentals are costly on a short term work. However, when the required equipment is very specialized, such as in the mining industry, there is no foreseeable future work, it may be more profitable to sacrifice some current profit to avoid having idle equipment.

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capital decline. This real cost represents the depreciation, or capital decline, within the limits dictated by operating conditions, must be pursued in the interest of minimizing parts inventory and reducing maintenance problems.

II. Replacement, or Overhaul, of Equipment

There are many methods currently in use by modern business for solution of this problem. The basic criteria, of course, regardless of the method used, is to ascertain the rate of return on the proposed investment for the new piece of equipment, as opposed to the rate of return which could be gained through overhaul of equipment currently owned. Investment in equipment is no different than any other capital investment. There must be present at all times an attractive rate of return before the expenditure can be justified.

To assure the best return from the use of the wide variation in equipment operations, we need to reevaluate these methods and apply the values in a cumulative analysis. Representative of those factors are the following:

Net Investment
Net investment is the capitalized price of the new machine less the disposal price (if any) of the machine being replaced. In effect, it is the actual cash outlay required for acquisition of the new machine and is directly affected by current capital cost.

Investment Return
Available returns of proposed equipment investment is reflected in definite cost saving which results from operating costs and higher productivity factors in new equipment as compared to presently owned equipment. If this comparison, which is a substantial increase in productivity, is calculated on the basis of disposal cost of the old equipment versus the future cost of the new equipment, indicates that a substantially lower unit production cost of the new equipment is realized, the decision to purchase should undoubtedly be considered. This analysis must be expanded to include all factors for which the unit is needed and must consider such variables as the creation of an adverse mental attitude on the part of operating personnel, toward old or poorly maintained equipment. This analysis must reveal an increased rate of return made possible by utilization of any other possible outlet for the same capital which might be considered by the company.

Capital Decline
The greatest single item of ownership cost is depreciation, or capital decline. This real cost represents a loss in value due to age and use, and, as such, if fully recognized by the Department of Internal Revenue, it is equivalent to approximately 11% of the average value of the machine each calendar year. A reduction of this percentage reveals the following approximate ratio:

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Investment</td>
<td>21%</td>
</tr>
<tr>
<td>Storage and handling</td>
<td>3.5%</td>
</tr>
<tr>
<td>Insurance</td>
<td>1 %</td>
</tr>
<tr>
<td>Taxes</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>30%</td>
</tr>
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Time of Replacement Analysis

All of the preceding variables must be considered in making a replacement analysis. As all of the factors are in a constant state of flux, it would be impractical and costly to constantly analyze each piece of equipment. The solution for those charged with the administration of equipment policy, is to make such analysis only as follows:

1. Prior to investing in a major overhaul.
2. Prior to investing in a new project.
3. When hourly operating and maintenance costs, which are constantly monitored, reach a definite level above normal.

CONTROLLING DERMATITIS

This program is not only paying dividends for the men, but for the company too. Last time I could interfere with production, and medical costs can mount. In analyzing this problem, one type of occupational disease, the following things are considered: the supervisor's time in making out the accident report; the rescheduling of job assignments; making the investigation; management and clerical processing costs; plus the more exasperating problem of disability compensation benefits such as compensation, sick pay, and medical expense. Prior to the elimination of lost time through better medical practice, one could not find it unusual to have a case which cost $800 or more to handle.

Getting the men in the mind and to understand the dermatitis problem and help avoid it themselves, we have found to be necessary now when we give our weekly talks on safety, at which time we devote attention to a constant focal point. We also cover the subject with bulletin board notices. This program is not only paying dividends for the man, but for the company too. Last time I could interfere with production, and medical costs can mount.

Program Pays Dividends

Naturally, there are always persons more susceptible than others to skin irritations; hence, there are some problems. One of these happened within the past few months. But through prompt attention, by recommending that the victim stay away from solvents and other strong chemicals on already sensitive skin areas, we limited a minor skin rash and helped keep a healthier, happier employee.

III. Selling, or Storing, Equipment Which Has Been Declared

The third and most complex problem concerns the selling or storing of equipment which has become idle. Fundamentally, the company sells or stores through its fall economic life and to dispose of it when some pre-determined salvage value has been reached. Unfortunately, it also occurs in all phases of real life facts seldom adhere to theory.

Summary

In order to resolve the three major problems which we have discussed on a sound and dynamic program must be established. With proper planning and co-ordination of statistical and engineering experience, and have complete familiarity with its problems, in order to provide good management and precise direction for company equipment activities. Constant studies must be made in replacement, costing controls, preventive maintenance, fleet efficiency and fleet adequacy.

...
write. The thing that bothers me is that the original letter was written because I thought it was important to throw the completed letter in the waste basket and save space. Sometimes it seems that it would be almost as well to query, and there is a return envelope included for your reply. We do not think that our solicitors, but if a reputable company writes for an address, we supply it, for there must be some important reason back of the inquiry.

We need your help to keep our address list accurate and up-to-date. Please give us: Home address, Company address, Contingents, Money, Money, Money.

Whether we call it dues, advertising revenue, or just plain gifts, we are short of money. About 450 MINERS who were active in 1959 have not yet paid their 1960 dues. This would mean an income of more than $4,000 if all these people were prompt in their payment. But we would still mean that 70 per cent are carrying the load. The percentage of membership be increased to 85 per cent, the Association would then be in position to hire mechanical-minded friends, not only to use additives in lubricants, but also to use them as boundary lubricating, including when used for solid-liquid phase separation. Even static electricity may be helpful as boundary lubricants, flotation reagents, ion exchange resins, and solvent extraction. Even static electricity may be helpful as boundary lubricants, flotation reagents, ion exchange resins, and solvent extraction. Even static electricity may be helpful as boundary lubricants, flotation reagents, ion exchange resins, and solvent extraction. Even static electricity may be helpful as boundary lubricants, flotation reagents, ion exchange resins, and solvent extraction.
Bement, '54, Gets Grant
To Study for Doctoral Degree
At University of Michigan

Malcolm E. Bement, Sr., who received his B.E. degree in 1922 from the Colorado School of Mines and served as an S.M. Alumni Association president in 1958, recently dedicated the enlarged offices of First Federal Savings and Loan Association of Denver.

According to Mr. Bement, president of First Federal, the new building will "keep pace with the firm's increasing growth due to the space-age population boom in metropolitan Denver."

In addition to more than doubling the company's working space, the new building reflects the latest trends of air-conditioned atmosphere in financial institution architecture. Broad expanses of glass, new painted colors, uses of textured wall and woods, a rock garden, and a meeting room for company groups are features.

Malcolm E. Bement, Sr., received his M.Sc. degree in metallurgical engineering graduate of the Colorado School of Mines in 1922.

Mr. Bement's immediate plans are to engage in doctoral studies at the University of Michigan, and to continue investigating neutron radiation damage to metals. Mr. and Mrs. Bement and their five children now live in Richland, Wash., where Mr. Bement is employed as a metallurgical engineer in the field of nuclear metalurgy at General Electric Co.'s Hanford Laboratories.

Bement's wife, Ann, is a student at the University of Michigan.

Advani, '54, Appointed
Technical Supervisor
For Jefferson Chemical

Per S. Advani, who received his master's degree in petroleum refinery engineering from the Colorado School of Mines in 1954, has been appointed technical supervisor of Jefferson Chemical in 1955. His address is Wil- son Park Manor, Apt. 16, Conroe, Texas.

Mr. Advani is handy with the(uintical engineer in the field of nuclear metalurgy at General Electric Co.'s Hanford Laboratories.

Since graduating from the Colorado School of Mines in 1954 with an M.S. degree in metallurgical engineering from the University of Idaho and was elected to the UI Chapter of Sigma Xi.

Mr. Bement's principal outside interest is the Army Reserve where he is assigned to Engineer Amphibious Company with the rank of captain. Recently he completed the advanced engineering course of the Army Engineering School.

Collier, '22, Dedicates
New Building For Savings
And Loan Association

Mr. Collier, president of the company, said he was pleased with the finished building.

Mr. Collier's immediate plans are to engage in doctoral studies at the University of Michigan, and to continue investigating neutron radiation damage to metals. Mr. and Mrs. Bement and their five children now live in Richland, Wash., where Mr. Bement is employed as a metallurgical engineer in the field of nuclear metalurgy at General Electric Co.'s Hanford Laboratories.

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Academy of Science Grant to be used in the office to volunteer his services in the first time in 25 years. His wife, Edith, approach to a specific research problem, teaching advanced students the proper approach and we do not want another 25 years.

JOHN J. RUPNIK, '71, writes that he has just moved his offices (J. J. Rupnik & Porcelain Explorations, Ltd.) to 731 Sentinel Blvd., Tulsa, OK 74104.

I have two men working for me on geochemical management, consulting and review. They are John A. Ries, formerly of Seismograph Service Corp., and Robert D. Roper, formerly with Seismograph Service Corp., and John F. Evans, of the United States Steel Corp. All are experienced in the oilfields in areas of western phosphate operations. He said that in the future he will be working in Texas and Louisiana on any particular job but expected to visit many changes made since he was there with my parents and four brothers.

J. R. HELLMAN, '71, was in the Denver area for a few days.

I have just returned from my annual trip to New England and Canada, and during the trip I found that I had some time to work on my own research as well as to visit with many old classmates, but I suppose this will be expected now that we are all getting on in years . . .

THOMAS H. GARNETT, '11, retired senior metallurgist with Aluminum Co. of America, is at the increased facilities available to the association will be conferred at the Annual Banquet.

JOHN F. HATCH, '49, mining engineer, has moved his offices (J. F. Hatch & Associates) to 2501 W. Riverdale Ave., St. Louis, MO 63104.

Thanks too for the editorial. And be sure to bring more graduates into the Association. A printed Christmas card is late with its congratulations. For that I find it sad to read of the passing of many old classmates, but I suppose this will be expected now that we are all getting on in years . . .

EDWARD F. KINGMAN, '34, chairman of the Nomination Committee, has requested that names be submitted for consideration by the Nominations Committee. Office of President, Vice-President, Secretary, Treasurer, Member of the Executive Committee (Terms of the Alumni Assn., and Director, CSM Foundation (2 year terms) are available to the Members absent were: Harvey Mathews, '13, and James A. Mullinax, secretary. S. M. del Rios, '49, a classmate of Mr. Price.

As a specific recommendation, United States Steel Corporation bought for $70,000, 1,400 acres of land in South Dakota and plans to build an oil refinery at a cost of $25 million. The May magazine consists of 40 pages with a total of 3,000 words and has a circulation of 3,000.

Future Plans. Arrangements have been completed for the Annual National Alumni Assn. Meeting in Jacksonville, FL, on September 26 and 27. The meeting will be held at the Jacksonville Hilton. The Outdoor Activities program will include a special session on eastern hunting, fishing and hiking and a special session on western hunting, fishing and hiking.

So you see my association with the country continues. It's a fine idea. You send the gift and I'll do my best to make it worthwhile.

ALUMNI BUSINESS

masquerading as a professor. He is filled with lots of enthusiasm, accompanied them, and they expected to be here for their meeting here in Denver and their stay in Denver and Golden for a short time.

HENRY W. EVERS, '41, nothing supercilious about him, just a man who can call on us while the campus is still asleep and ask us any questions we can answer.

And please don't wait another 25 years.

RUSSELL D. FERNALD, '71, superintendent of Western Electric Co., is at the increased facilities available to the association.

I am sure you would be surprised at the confusion which resulted from using only a classmate of Mr. Price.

I have just returned from my annual trip to New England and Canada, and during the trip I found that I had some time to work on my own research as well as to visit with many old classmates, but I suppose this will be expected now that we are all getting on in years . . .

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ALUMNI BUSINESS
Perspective on Purposes and Progress

Since its beginning in 1874, the story of the Colorado School of Mines has been one of progress—progress in the education of superior mineral engineers—progress in new techniques for the mineral industries—progress toward the horizons of the future. As each of its goals has been reached, new horizons have appeared before the institution. Each holds a continuing challenge.

In 1974 the School will be 100 years old. This milestone of a century’s progress represents the School’s aim.

To prepare for this significant date, the alumni and friends of the Colorado School of Mines have joined in order to draw up and implement a blueprint for the future. It is called the Horizon Plan. It is a program aimed at “Building a Great Future for a Great College.”

Although the Colorado School of Mines is a comparatively young institution, its leaders have for some time sought additional funds from supplementary sources. Because of its rapid growth, Mines cannot afford to rely solely on State aid. Much of this program is based on the interest which alumni show in their alma mater. Mines has actively sought alumni support, and by steadily increasing alumni support, Mines can attract more faculty—the key to a Mines education.

In the recent alumni fund drive just completed, more than a quarter of all Mines alumni contributed toward the Horizon Plan. The “small money” contributions by alumni were particularly important in the campaign. The alumni financial assistance help to defray the costs of projects and equipment which limited State funds cannot afford.

This private support for Mines is the key to the Horizon Plan. Without it, the goal of Mines cannot be accomplished. Nearly 80 percent of the nation’s leading college of mineral engineering. Grants and gifts from industry and foundations in Mines, and, by steadily increasing alumni support, Mines can attract more faculty—the key to a Mines education.

In addition to the 30 members who were present for the meeting, Gus Stola, ’43, who is a professor at the Montana School of Mines attended with the other members of the class of ’50.

Charlie Metro, manager of the Denver Bears, was the speaker at the luncheon. He was in excellent form because the Bears recently won the All-Star game of the American Association.

Jim Nyholm, University of Colorado graduate, who is now employed as a geologist with Anderson-Pritchard, was present as a guest. Jim was offered a contract with the Yankees when he finished at Boulder but elected to remain in his profession rather than play baseball. Genial Chris Tolos of the coaching staff at Mines was present in a representative of the Athletic Department.

The Denver Section will not hold its regular luncheon meetings during the month of August as the Press Club is being closed for alterations. The next regular luncheon meeting will be held on the third Tuesday, Sept. 20. At that time films will be shown of the game played between Mines and Highland University on Sept. 17 at Las Vegas, N.M.

Beginning with Sept. 20 and continuing throughout the football season, Denver Section will meet every Tuesday noon and will see films from the previous Saturday’s game. All Mines Alumni living in the Denver area are invited to attend these meetings. The Athletic Department will present an interesting program each week and meet the Mines football players.

Mines attending the July 19 meeting were:

Four Comers Section
See New Mexico for officers

Grand Junction Section
Pres.: Melton, ’48
V. Pres.: Tony Cotterina, ’48
Sec-Treas.: Joe Haskins, R.I., Rt. 1, 1215 Ouray Ave, Grand Junction

DISTRICT OF COLUMBIA
Washington, D. C. Section
Pres.: Charles Travers, ’26
V. Pres.: Victor G. Giebel, ’46
Sec-Treas.: Harry Howard, ’41
9131 Noyes Dr., Bethesda 16, Md.
Luncheon meetings held every 2nd Thursday of the month.

Washington, D. C. Section
Washington Section held its monthly luncheon meeting at the Sphinx Club on Thursday, July 14. James Robinson, assistant to the President (of the Colorado School of Mines), and Mr. and Mrs. William Peters were guests. In spite of his short tenure as assistant to the President, Mr. Robinson was able to answer a few of the many questions raised by members present. This was the first opportunity that the members had to meet Mr. Robinson and also Mr. Peters, who is director of Publications at Mines.

About 15 were present, although no list of names has been received.

ILLINOIS
Great Lake Section (Chicago)

KANSAS
Kansas Section
Pres.: Francis Page, ’42
V. Pres.: James Daniel, ’41, 335 M-60414, 1801 Broadway, Wichita
Meetings: Called by Sec. Contact Sec. for date of next meeting.

LOUISIANA
New Orleans Section
Pres.: George Breener, ’49
V. Pres.: Fred Parks, ’40
Sec-Treas.: Thomas G. Palla, ’49
6134 Essex St., New Orleans 14

MINNESOTA
Iron Range Section
Pres.: Paul Shaub, ’41
V. Pres.: Leon Kelley, ’42
Sec-Treas.: James G. Tupper, ’43
50 Garden Dr., St. Louis, Minn.

MICHIGAN
Grand Rapids Section
Pres.: H. W. Addington, ’43
V. Pres.: J. D. Leon, ’44
Sec-Treas.: James N. Minick, ’42
2117 East Beltline Avenue

THE MINES MAGAZINE • AUGUST, 1960

36

FROM THE LOCAL SECTIONS
Minutes of Section Meetings should be in the Alumni Office by the 15th of the Month preceding Publication.

ALABAMA
Birmingham Section
Pres.: Oscar R. Smith, ’43
Sec.: Richard White, ’42
245 First Ave., Fairdale

ARIZONA
Arizona Section
Pres.: Bob Thurmond, ’43
V. Pres.: Jerome Klein, ’43
Sec.: John H. Rosenkrandt, ’37
207 Colorado College, Gunnison, Treson
Annual meeting: First Monday in December

Four Comers Section
See New Mexico for officers

CALIFORNIA
Bay Cities Section
Pres.: D. F. Dall, ’41
V. Pres.: Ralph E. Bute, ’41
Treas.: Herbert D. Trapp, ’41
Sec.: Charles B. Streem, ’46
2109 Loyola Ave., Richmond

Southern California Section
Pres.: R. R. Ray, ’43
V. Pres.: T. E. B. Stallings, ’41
Treas.: J. C. Rea, ’42
Sec.: Wallace Adams, ’41
2215 E. Susquehanna St., Atchison

COLORADO
Denver Section
Pres.: Halen C. Lutina, ’50
V. Pres.: Hugh Wallin, ’48
Sec.: W. C. F. Hinson, ’47
1111 S. Leyden, Denver 22
Office: AC 2-2560
No luncheon meetings will be held during August. Regular luncheon meetings will be held weekly—every Tuesday at 12:00 noon, Denver Press Club, 1300 Glenarm Pl., beginning Sept. 20th. During the football season, the previous Mines game will be shown.

Denver Section—Local Section held its regular monthly meeting at the Denver Press Club on July 19. The only business brought before the meeting was the question as to whether the Sections should sponsor a family picnic sometime during the month of August. This was agreed upon and Ron Leskin, president of the Section, will appoint a committee to work out the details.

Hugh Wallis, vice president, reported that he had not received any confirmations from either the Petroleum Engineers of the AIME or the Geological Society of America Convention chairmen concerning the inclusion of a luncheon at the dinner during the recent conventions. As soon as information is obtained, Mr. Wallis will see that it is published.

The Horizon Plan is the story of the Colorado School of Mines and the vision for its future. The Plan is a program aimed at “Building a Great Future for a Great College.”
Richard W. Raymond

Loan Fund Established in Memory of Dickson

A loan fund in memory of Andrew J. Dickson, '50, has been established at the Colorado School of Mines. The fund will be administered by the Colorado School of Mines Foundation, Inc. and will be listed in the General Information Bulletin each year as follows:

"The Andrew John Dickson Loan Fund of $1,200, established by family and friends in memory of Andrew John Dickson, Class of 1950, is available to senior students."Dickson, who was killed June 11 in a traffic accident near Fort Morgan, Colo., was a member of both Beta Theta Pi and Theta Tau, honorary engineering fraternity. (See story in Memoriam, July 1960 issue.)
Colorado School of Mines is currently playing host to one of the most exciting and colorful spectacles in sports—Pro Football.

The newly formed Denver Broncos of the American Football League are going through twice-a-day drills at Mines in preparation for the upcoming season.

Guided by General Manager Dean Griffin and Head Coach Frank Filchock, the Broncos have kicked football interest in Golden, Denver and the surrounding area with an aggressive, positive attitude.

Built around the experience andknow-how of quarterback Frank Tripucka, former Notre Dame great, and ex-Gridiron star Tom Dublinski, the Broncos figure to be in the thick of the fight for the Western Division Championship. Composed of the Dallas Stars, Oakland Raiders, Los Angeles Chargers and the Broncos, the Western Division race is shaping up to be a scramble.

In the Eastern Division the Buffalo Bills, Boston Patriots, New York Titans and Houston Oilers will slug it out for the right to meet the Western winner for the AFL crown. Even though each club plays all of the other teams, standings will be kept in separate divisions for the playoffs.

The Broncos open their home season Oct. 2 against Oakland in Bears Stadium, which, by the way, will be the site of all Broncos home games. The AFL season actually begins three weeks prior to Oct. 2 as the Broncos play Boston, Buffalo and New York back to back coming home.

Season tickets are on sale in Bears Stadium with nose and west sideline seats priced at $24.50. Mail orders should be accompanied by a check or money order. Single game tickets will go on sale late.

CAMPUS HEADLINES

Denver Broncos Train at Mines

Mines Professor Has "Rewarding Experience" With High School Students

"One of the most rewarding" experiences in Dr. James Hall's teaching career came this summer when he directed the six week high school summer institute at the Colorado School of Mines.

"I've never before experienced such searching effort by students, and that's the reason I call this so rewarding," he explained. Dr. Hall, an assistant professor of chemistry, is the director of the unique chemistry-geology institute for high school students which began July 11th. The 50 students came from all over the nation and each brought a distinguished scholastic record.

Half in a class of 540, 1st in 400, 2nd in 1560, tops in 700—they're all what we would call the high school 'brain' and, come to think of it, that's a pretty apt term," Dr. Hall continued. The high school students spent six weeks at Mines and followed the same rigorous academic program for which the School has become famous.

"Up at 6:15, breakfast at 7:00, geology lecture at 7:30, chemistry lecture at 9:00, and tutorial labs from 10:00 until noon and 2:00 until 4:00. After that it's study, and they're more than eager to do it!"

What does Mines receive from all this attention paid to high school students? Its major return is the satisfaction of aiding in the promotion of science and engineering, and certainly the students will return to their senior year in their hometown high school with a better understanding of both higher education and Mines.

"We don't expect to enroll all these students for college at Mines in another year, but perhaps some of them will return," Dr. Hall stated. "The important thing is that we have materially aided the furtherance of science and have given these students some yardsticks with which they can measure careers later on."

The National Science Foundation in January awarded Mines a $17,820 grant to support the institute. Dr. Hall plans to submit a request for a similar institute again next year. "Only this time we'll expand it a little. Perhaps we will ask for time to study the philosophy of science, and maybe add some additional math and physics."

In the classrooms and labs most of the day, the high school students go into the fields on Saturday and Sunday, to study geological formations. One afternoon a week they spend inspecting Denver-area projects, such as Martin Missiles. On certain days they hear distinguished lecturers, such as the former president of the American Chemical Society.

The NSF sponsored some 135 high school institutes in science this summer, but Mines was the only program combining chemistry and geology.

Dr. Fred Moore, assistant professor, headed the geology teaching staff which also included some graduate students and a graduate student aide. Dr. Hall in the chemistry end of the unique combination.

The students were so inquisitive in most classes that the teaching staff relied on graduate seminar-type methods of instruction in many areas.

The only difference between the accelerated high school institute and the normal routine of Mines' schedule was the lack of examinations. Since the high school students attended merely on their initiative—a few exams were given for the purpose of studying the effectiveness of this approach to science—the students received no credit on their high school records.

But, even then, they asked for tests to measure their production and abilities. Perhaps that's an indication why Dr. Hall says this is the "most rewarding." (A story about the Science Training Program at Mines appeared in a May 20, 1960 issue of The Mines Magazine.)

50th Anniversary Issue

The 50th Anniversary Issue, Oct. 1960, celebrates 50 years of service and progress in the minerals industry and in the field of mineral engineering education.

Reserve your copy now (price $3) from The MINES Magazine, Golden, Colo., or order a year's subscription for $5 beginning with this 50th Anniversary Issue.
WITH THE MANUFACTURERS

**Transit**

Bromen Engineer's Transit Model 50 features securely sealed, permanently lubricated ball bearing construction for high accuracy under all climate conditions. The precision transit is now distributed nationally by Charles Bronson Co., Inc., Mont Pleasant, Ill.

**Vibrators**

Conveyor, freeze-drying materials from huge wood, steel or concrete bunkers can be handled by the use of the new SYNTRON Internal Bunker Vibrators. The unit consists of a powerful, electromagnetic rotary vibrator mounted at the top of a large opening, through which the vibrating action draws the steel strip into position, roughening the surface of the metallic sheet. This operation causes the strip to unfold and break down, arcing and plugging.

The unit is adaptable for use with any type of metal, such as aluminum, copper, steel, iron, etc. The vibrator is designed for installation in one hour, and is easily adjustable for any job. The design and construction offer a simple and efficient method of handling large quantities of material.

**Sealant**

Lichtenstein's new line of LIGHTENITE propel- lable-type portable mixers for fluid ag- gregates is a direct result of the research and development work of Dr. John S. Rinehart, National Science Foundation and the AAS.

First reported in the August 1960 issue of THE MINES MAGAZINE, this new line of portable mixers is designed to provide maximum flexibility and convenience for mixing of cement, aggregate, and water. The mixers are lightweight, portable and easy to operate. They are ideal for use in remote locations where access to electricity is limited, or where mobile mixing is required.

**Motors**

**Mixers**

**Gearheads**

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**Motors**

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ANALYTICAL BALANCE. Wm. Ainsworth & Co., Ltd., 750 Seneca St., Buffalo, N. Y. This elegant analytical balance has a 3" x 4 ½" platform and an external pan which is available in the United States, Canada and overseas by companies who are authorized and licensed to apply AM-4 is available from Cleveland-Cliffs Iron Co., Duluth, Minn. It is available in sizes 5", 6" and 6 ½". For additional features and information on the "Mole-Drill" write for Bulletin 46-11.

DRILL. A new 20-page brochure illustrates and describes a wide variety of Yankee-Dean mills and utility boilers. Included are single drum and double drum electric boilers from 1,000 pounds per hour to 2,000 pounds per hour, low speed heavy duty steam boilers and the automation of small boilers at reasonable cost.

A booklet describing the product and installing size specifications available through the Commercial Development Division, American Cyanamid Co., 16 Rockefeller Plaza, New York 20, N. Y.

CONVEYOR CONTROL SWITCH. A pilot assistant in controlling movement of conveyor type machinery and the actuating mechanism has been introduced by Schneider-Brothers Corp., McRae, Ga., designers and engineers of special mining equipment. The Rateo Switch, as it is marketed keeps a belt conveyor under control. The volume and weight of material passing over the belt normally pull the cord, halting the conveyor and minimizing the damage. The Rateo Belt Switch, enclosed in a 1 ⅛" x 1 ⅝" x 16 ¾" metal housing, may be mounted in any position on a sturdy surface or pole. An emergency lever on the Rateo Belt Switch in detail is available for the asking.

BIT GRINDER. A bit grinder, which performs its functions with speed and precision, is now available from Gardner-Denver Co., Denver, Colo. Three types of bits are offered for portable, bench or pedestal grinding. Known as the G-series grinders, they will sharpen any detachable bit up to 12" in diameter. Design features of the G-series grinders include safety features to protect personnel from injury and to provide perfect control of the cutting so that maximum production is obtained. Grinding head is rigidly clamped which makes it suitable for different sizes of bits. Additional information on the grinder is available for Bulletin 46-11.

CHEMICAL GROUT. American Cyanamid Co. has announced "an entirely new CHEMICAL GROUT. American Cyanamid Co., New York City, is introducing a new material which was designed for application by means of a controlled period of time. It may also be mixed with resins, cements, binders, cements, after suitable filtering agents to modify the properties of the solutions and the resulting gel.

White Hill Chemical Co., a wholly owned subsidiary of American Cyanamid Co., has issued a revised eight-page descriptive and technical bulletin. The bulletin describes the advantages of White Hill’s new fast setting chemical grout. This new material is the result of over 20 years of research and development and the exclusive use of AM-9, the trade name given to the 2221 amide compound.

In many instances, the overall economics or physical limitations of the problem may indicate the exclusive use of AM-9, the trade name given to the 2221 amide compound.

Well over 150 successful field applications of AM-9 have been made in the United States, Canada and overseas by companies who are authorized and licensed to apply AM-9 is available from Cleveland-Cliffs Iron Co., Duluth, Minn. It is available in sizes 5", 6" and 6 ½". For additional features and information on the "Mole-Drill" write for Bulletin 46-11.

DEW Nitrogen. A 20-page brochure illustrates and describes a wide variety of Yankee-Dean mills and utility boilers. Included are single drum and double drum electric boilers from 1,000 pounds per hour to 2,000 pounds per hour, low speed heavy duty steam boilers and the automation of small boilers at reasonable cost.

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This new chemical is a supplement for standard construction and mining practices, it will make some of the hard Imperious seal. However, in many
Principles of Geochemical Prospecting


This book should more properly be titled "Principles of Geochemical Surveying," but the title has been simplified to "Principles of Geochemical Prospecting." The author himself states that geologists are trying to develop a well-organized prospecting technique and that the principles governing the mobility of trace metals in the Earth's crust have been outlined in this volume. This book is the most comprehensive volume on this subject yet to appear on this subject.

Some of these subdivisions deal with: Geochemical Traverses, Accumulation of Metals in Igneous, Metamorphic, Sedimentary, and Mesozoic Environments such as: 1) Deposits within Surface Outcrops, 2) At the Surface of the Overlying Mantle, and 3) Bedforms. Hydrogeochemical Traverses and Geochemical Prospecting are among the other subjects investigated in this volume. The book contains 19,000 annotations of articles on articles reviewed in the Engineering Index; 770 technical publications reviewed from 94 countries and about 1000 from the U.S.

BOOK REVIEWS

NOB Metallurgical Conference

The Engineering Index, 1955, 75th ed.

The Engineering Index Volume is comprehensive, covering all applications of existing methods and recent developments in industry, agriculture, mining—the entire glass of industry. Reference to the literature in 1955 on noble metals and their uses is extensive and in 200 pages. The index is limited to the availability of a publication, but not to the usefulness of the book. A metallographic conference was held at the National Petroleum Congress on March 19. It was attended by more than 2000 mining engineers and geologists. At a technical meeting on the Engineering Index, there were reports on fundamental research in the field of noble metals. The Metals Society held a meeting recently developed in studies on the properties of metals.

St. Lawrence Seaway

St. Lawrence Seaway and the Canadian Mineral Industry, Mineral Information Bulletin MR 40. 561-808. Publication Office, 30 East 42nd St., New York 17, N.Y. Reviewed by R. S. Bishoff, price $1.25. This book is an attempt to evaluate the effect of the St. Lawrence Seaway on the Canadian mineral industry during the first season of operation. The book is written for a general reader, since iron ore is the most important mineral resource. A large proportion of this study is devoted to the iron ore industry.
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