SEPTEMBER • 1950

VOLUME XL

NO. 9

AMERICAN MINING CONGRESS IN SALT LAKE
SALT-BATH CHROMIZING
FUTURE OF GOLD
ROUND MOUNTAIN GOLD
URANIUM POLICIES
FLotation & CYANIDATION Tests
NEW EQUIPMENT
YUBA BUILDS PLANT TO PROCESS 17,000 TONS ORE DAILY

Nevada. To profitably work the property, a new approach was required.

Gold Dredging Corporation's vast ore bodies in Nye County, use of bucket ladder dredges impractical on Round Mountain. Steep bedrock, porous ground, and pit depth of 250' made the

YUBA WILL BUILD TO YOUR ORDER

Yuba engineers, in cooperation with Mr. W. C. Browning, Vice-president and consulting engineer of the Corporation, designed a plant that is basically a combination of gravel and open pit mining equipment, both of which are coupled with a dredge-type treating plant. A shovel and rail mounted crane with pedestal conveyor handle the ore in the open pit. Belt conveyors carry the ore from pit to stockpile. At the stockpile, YUBA erected a combination method solves problem

YUBA's complete plant is available to handle contract manufacturing for you. It is located at Benicia, California, handy to deep water, transcontinental railroad, river, tr railroad, and air shipping. This plant has a long-time reputation for skilled work, and an excellent record of stable labor relations.

Services Available to You Include—

• Carbon and alloy steel forging
• Heat treating
• Steel fabricating and welding
• Pattern shop
• Iron and bronze foundry
• Heavy and light machining
• Domestic and export shipping
• Engineering design and layout

These services are especially adaptable to manufacturers wishing to expand in the West without heavy capital outlay.

PERSONAL NOTES

Richard D. Porter, '43, Assistant Professor of Physical Metallurgy, University of California, is addressed Harry Mining Building, University of California, Berkeley, Calif.

H. Drill Redding, '42, Assistant District Rig Superintendent, Phillips Petroleum Company has a new residence address, 1239 Caldwell Street, Houston 4, Texas. Angus L. Robertson, '42, Party Chief, United Geophysical Company, is now being addressed Box 1004, Glandore, Mississippi.

W. G. Robinson, '43, Mining Engineer, Inland Steel Company, was vacationing in Denver last month. His mailing address is Box 131, Marion, Kentucky.

Major William C. Rogers, '42, is returning to the United States with his family, following a twenty-two-month tour of duty with the U.S. Armed Forces in the Philippines. The Major who has been serving as ammunition supply officer and ground support officer for the 24th Supply Group Depot at Clark Air Force Base in Central Luzon, has been ordered to report to Fort Mason in California for further assignment.

A resident of California, Colorado, he has been in the service career since his college graduation. He is assigned to the Army Air Force Reserve Command, and completed Command and Staff College at Fort Leavenworth, Kansas, prior to leaving for assignment in the Philippines in August 1948.

Jene R. Reed, '44, has a new residence address, 1226 Arena Road, Kansas City, Missouri. He is Vice President of Ross Manufacturing Company.

L. E. Shaw, '48, enlisted at the Alumni Office the early part of July while on vacation from his duties as Senior Reservoir Engineer for Phillips Petroleum Company. His home address is 1226B Arno Road, Kansas City, Missouri.

Jerry W. Whalen, '41, called at the Alumni Office while on vacation from his duties as Senior Reservoir Engineer for Phillips Petroleum Company. His new residence address, 401 Main Street, Duluth 6, Minn., where he is Box 133, Marion, Kentucky.

THE MINES MAGAZINE • SEPTEMBER, 1950

McELROY RANCH COMPANY

OIL PRODUCERS AND ROYALTIES

CATTLE GROWERS

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EDWARD J. BROOK '23

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GOLD OR SILVER, 75c EACH

Complete Price List on Request. Prompt Service—Accurate Results

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“National” Brands Safety Fuse for use in all Blasting Operations

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Kirkwood Mountain Distributors—Primacord-Bickford Detonating Fuse for deep well blasting.
Professional... CARDS

RETURNED TO THE STATES
From BEN F. RUMMERFIELD, '40, Century Geophysical Corporation, Box 213, Tulsa, Okla.

I have recently returned from Mexico to the United States. Please change my address to the one you have in that given me above.

In returning to the States I have taken a position as Manager of Seismic Operations for Century Geophysical Corporation.

Needless to say I am very pleased with my present position and I am very nice to be back in the States after an absence of five years.

INSTALLED IN HIS FIRST JOB
From EDWARD E. HOFFMAN, 46, 365 Princeton Road, Pasadena, Calif.

Edward Earlougher, 36, Registered Engineer
319 E. Fourth St. Tulsa 3, Okla.

Petroleum Consultants — Core Analysis

From R. D. KAUN, Standard Oil and Gas Company, Tulsa, Okla.

These graduates of Colorado School of Mines have recently been employed by Standard Oil and Gas Company.

HASP H. REEDLEY, 46, Producing department, Rangeley, Colo.
PETER J. BIESK, 46, Producing department, Box 532, Brownwood, Texas.

WILLFRED P. Mac leaned, 46, Exploration department, Steamboat Springs, Colo.

MAREA B. HERNLUND, 46, Exploration department, Steamboat Springs, Colo.

WAYNE A. Mac QUINN, 46, Producing department, Box 715, Beaumont, Texas.

K. N. V. PROWELL, 46, Producing department, Silt Creek Area, Box 128, Midland, Texas.

APPLIES TO WORK OF PLACEMENT SERVICE
From PAUL J. ROKOS, '49, Friends Avenue, Bethlehem, Penna.

I wish to inform you and the Placement Service that I accepted a job with The Bethlehem Steel Company at their Lehigh Plant located at Bethlehem, Penna.

I started work as of August 1, 1950.

Thank you for the interest and consideration you have given me with my application with the “Capability Exchange.”

HAS CANDIDATE FOR CLASS OF 1967 AT MINES
From M. JORDAN NATHANSON, '47, 193 South Holliston, Pasadena, Calif.

Registered is my check in payment of dues for 1950-1951. Please accept my apologies for not getting my dues in sooner, but as you know the T.T. Wink’s household bookkeeping is never too good. To make certain of my 1951 dues, I have paid them in advance.

This is a good opportunity for any Mines student who has a candidate for the 1947 class. He received two months ago—name of Neil, and will follow his brother, Bob, in 1948. That makes three in the family, including myself, who is six and a half.

The firm of Western Stelites, Inc. has a process which stimulates micro-penny in metal castings designed to be pressure tight. We have licensed our process and are operating under contract to do this work on an industrial scale.

The process and materials are approved by Army, Navy and Air Force, and it has been highly successful. My associate and I am both Reserve Officers and we hope we can complete the installation of these plants in the East before Uncle Sam wants us back.

Sorry again about the dues, and pass my regards along to the Mines in Denver.

TWO INTERESTING NEWS ITEMS
From CHARLES B. BELLEW, '50, Tecoma, California.

I have just learned that the change of address was unnoticed from the Personal Notes in Mines Magazine.

My new address is that given above where I am employed as a junior engineer and geologist by Anaconda Copper Mining Company, Butte, Montana.

I also wish to announce my marriage on June 26 to Miss Audrey J. Nelson at the First Presbyterian Church in Butte, Montana. My wife is the daughter of Mr. and Mrs. Henry D. Nelson of Butte who had always resided until the past year and a half when he went to Butte.

It is estimated that over 5000 visitors attended the technical sessions and machinery and equipment exhibits.

Over 125 exhibitors were represented, all of whom have given salesmen all their frequently manufactured equipment of all kinds of equipment used in the mineral industries. There is very little question but what the largest assembly of up-to- date machinery and equipment ever was shown in our minerals industries that has ever been displayed in an exhibit of this type.

Those who were fortunate enough to attend the Convention had the opportunity of examining the latest improvements and trends in mining machinery. Technical sessions were held almost continuously throughout the four days. All types of mineral subjects were covered by men well known to the mining industry and thoroughly familiar with the various subjects which were covered. Even though the weather was rather cloudy, all sessions were well attended. Some of the general subjects covered were: Monetary Policy, Mine Operation Problems, Strategic Metals and Stock Piling, Tariffs and Taxes, Milling Methods, Development and Exploration, Safety and Labor Relations.

Dr. John Vanderwilt, "Mines" President

At a late hour, the Mines Alumni Section Breakfast was held.

I wish to inform you that I accepted a job with The Mines Alumni Section which will be held on August 31, 1950.

To make certain of my 1951 dues, I have paid them in advance.

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Dr. John Vanderwilt, "Mines" President
GREATER AIR COVERAGE and more effective diffusion of
POSITIVE AIR CONTROL
HIGHER GRADE concentrate in least flotation time

cell pulp level control

Orfho-Phase Log Log Standard model for
THE MINES MAGAZINE • SEPTEMBER, 1950

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on front: C, LLi, Df-Cf to GIF, C!,

Size 12½ x 1½ x ¾.
No. 500 (illustrated) complete with fall carrying case and in­struction manual $13.95
No. 1000 Orfho-Phase Duplex all-metal Slide Rule.
Size 12½ x 1½ x ¾ $8.65

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1636 CHAMPA ST. • DENVER, Colo.

TECHNICAL MEN WANTED

Those interested in any of the positions listed may make application through "Mines" Capability Exchange, 744 Cooper Building, Denver 2, Colorado.

(241) INSURANCE SALESMEN. An old establish­ment in the insurance business offers positions to ambitious men, who can show a record of successful sales experience. Must be capable of earning several thousand dollars per year.

(1183) PHYSICISTS and ENGINEERS. The well-known firm of physicists and engineers is reporting a number of openings in the field of research. Applicants must have a good working knowledge of electronics and electrical engineering, and long experience in the field. Several superior positions available for college graduates.

(1185) MINING AND METALLURGICAL ENGINEERS. A prominent mining company has several openings in the metallurgical field. Positions are available for men with extensive experience in concentration of ores. Salary will depend on the experience and ability of the applicant.

(1209) MINING ENGINEER. Company operating non-metallic mines and equipment. Salary open.

OTHER PRODUCTS

MINE & SMELTER SUPPLY COMPANY

Lead Company, he resides at 350 Church
where he is addressed in care of Duval
35th Street, Tulsa, Oklahoma.

Robert P. Comstock, '41, Field Engineer for Standard Oil Company of Ohio, has a change of address from Thermopolis, Wyoming, to change, 734 Cooper Building, Denver 2, Colorado.

Col. Louis E. Cotulla, '25, has been
appointed by his wife and two children, was vaca­
tion in Denver last month. He is a native of Kansas, and has been employed in various capacities.

John W. Barnes, '25, has been
appointed by his wife and two children, was vaca­
tion in Denver last month. He is a native of Kansas, and has been employed in various capacities.

Charles S. Ruiz, '40, Engineer and Geologist for American Smelting & Refining Company, has a change of address from Washington, D.C. His new address is 311, 00 Post Office, San Francisco, Calif.

Edward del Rio, '28, is President, Montreal Mining Company, and teaches in his duties as General Superintendent.

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(Continued on page 9)

THE MINES MAGAZINE • SEPTEMBER, 1950

HERE'S PROOF...

Power Consumption Varies
With Grinding Mill Diameter

To show what happens to power costs with a change in mill diameter, here are data excerpted from actual reports from commercial operators over a period of years. Note that power consu­mption per ton of feed is roughly in proportion to mill diam­eter. You cannot compare mills of different diameter on the basis of equal power.

For live, HERE's why to buy ball and rod mills have been proved to give greater capacity than grinding mills of any other type, with corresponding savings in power per ton of finished product and generally better metallurgical results.

Ask our engineers to analyze your grinding problems without cost or obligation to you.

THE MINES MAGAZINE • SEPTEMBER, 1950

OTHER PRODUCTS

MINE & SMELTER SUPPLY COMPANY

IMPELLER AND FEED DISC ASSEMBLY

(Continued on page 16)
These contributors to "Mines" Placement Service assure its success and continuous expansion. It makes it possible for "Mines" Men to improve their employment by automatically presenting their qualifications to the mining field without the need for solicitation. During the past year, this service has become recognized as an important part of "Mines" work and its value to "Mines" Men has increased. It is a service that should be open to all "Mines" Men who have the ability but not the contacts with the mining field.

(Continued from page 7)

THE MINES MAGAZINE - SEPTEMBER, 1950

ACCURATE ASSAYING

ROLL CALLS

ACCURATE ASSAYING

DEMANDS PRECISION MADE EQUIPMENT AND QUALITY CHEMICALS

Furnace or cupel; flotation products and utmost care for quality, reagent or test lead...call on the Denver Fire Clay Company, pioneer suppliers of assay equipment and test supplies for 75 years. Designed for efficient, economical operation. Roll call at Denver Fire Clay Co., Denver, Colorado.


On Card Wheels!

Designed for efficient, economical operation. Longer life—based on metallurgy that produces strength where needed and wear-resisting chill at service points.

We're glad to quote your requirements.
Like Saturday's child, milling research at CF&I has to produce...in terms of today's commercial grinding practices. Mill operators think in terms of cost per ton of finished product, metallurgical efficiency, etc. That's why they are glad to work with CF&I's ore-dressing staff on current grinding media problems.

Through cooperation of this sort, the quality of grinding media has come a long way to reach its present high standards. Precision equipment and methods at CF&I make grinding balls that are uniformly dense, hard, and tough from surface to center. These forged steel balls hold their shape and resist impact and abrasion. They are used in some of the world's highest capacity grinding sections. The fine reputation of CF&I forged steel balls has been over 17 years in the building.

Let CF&I research work for you. A CF&I ore-dressing engineer is at your service on any grinding media application.

The Colorado Fuel and Iron Corporation
Denver

CF&I GRINDING BALLS and RODS
SALT-BATH CHROMIZING

By L. E. CAMPBELL, V. F. BRICK, R. F. HOEKEMAN, and B. W. GONDER
Bailey Laboratory, Battelle Memorial Institute, Columbus, Ohio

ABSTRACT

A variety of ferrous materials has been protected from corrosion in atmospheres containing a chromium chloride mixture. The case formation is equal to or greater than that obtained with the various pack methods at corresponding temperatures. The chromium chloride may be prepared in situ by the reduction of a chromium-containing mixture in a hydrogen atmosphere containing about 50 per cent chromium at the surface is satisfactory. The maximum temperature for stability in air, for example, in chromizing and chrome alloy surface are as satisfactory as for laboratory purposes. The present paper is concerned with the use of the chromium chloride in the production of a protective high-chromium alloy surface. The basic salt-bath composition, at the most convenient for laboratory-scale operations.

The resistance of chromium and chromium-containing alloys to corrosion under oxidizing conditions is well known. The maximum temperature for stability in air, for example, increases from about 500 °C for iron to about 900 °C for chromium and up to 1050-1100 °C for 25-30 per cent chromium steels.

Since the surface of a corrosion-resistant alloy is effective in opposing destructive attack, there are many instances in which iron or steel having a protective high-chromium alloy surface are satisfactory for a performance standpoint. A continuous stainless steel strip may be used for a variety of applications, and it has been found that the surface can be protected by a high-chromium chloride mixture. The surface is compatible with the base either in contact with chromium or in an alloy containing a chromium halide.

The principal mechanism in use is pack chromizing, which is a chromizing process. In this chromizing mixture is packed around parts in a tubular furnace and the charge heated to 1300-1400 °C in a hydrogen atmosphere. Variations which permit the use of the chromizing mixture include the use of a HCl-CH_3 mixture with a charge of chromium and of course, the use of a chromium chloride-inhibited ceramic pack in an inert or reducing atmosphere.

Preparation of Reagents

Chromic chloride.—It was first necessary in this investigation to work out a convenient method for the preparation of chromic chloride. Several methods were available, the reduction of anhydrous chromium chloride in a hydrogen-hydrogen chloride atmosphere being at the most convenient for laboratory-scale operations.

High-purity anhydrous chromium chloride was prepared by chlorination of a 25 per cent chromium steel, with tank chlorine in a horizontal argon atmosphere at temperatures from 500 °C for iron to about 900 °C for chromium and up to 1400 °C in a hydrogen atmosphere (1).

Since only the surface of a corrosive atmosphere due to the high-chromium alloy surface are as satisfactory as for laboratory purposes. The present paper is concerned with the use of the chromium chloride in the production of a protective high-chromium alloy surface. The basic salt-bath composition, at the most convenient for laboratory-scale operations.

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High-purity anhydrous chromi...
temperatures. Progressive solidification of this melt apparently began between 500 and 550°C. Penetration into resorbed areas was variable, requiring protection of some kind. Although an enclosed atmosphere was provided during Fusion casting, it is unknown whether some kind of freezing over might be occurring.

In the open air, especially at temperatures above 1000°C, the bath began to lose its surface rapidly by evaporation. With enclosed furnaces as used in this work, losses were not significant.

Severe decarburization occurred. Favorable results from 500 to 550°C were obtained from an oxidizing bath. Where air currents had free access to provide a barrier at the bath surface, severe oxidation and vaporization occurred. Fig. 3 shows a structure typical of those obtained from an oxidizing bath.

Materials: Chromized

Metals and alloys chromized in the small experimental furnaces are listed in Table 1. The 99%-21%-30% salt bath was used, and an argon atmosphere was provided. Rates of case formation on Armco iron are shown in Fig. 4. The effect of temperature on the rate of diffusion is evident.

Case Structure

The relation of structural details to the Fe-Cr constitution diagram is shown in Fig. 5 and 6. The outer band is alpha, solid solution of chromium in iron. The inner band, separated by a fine line, is transformed gamma phase. The two-phase gamma loop appears as an interface between these bands, in conformance with the rule of promotion considered. The heavy line represents the limit of chromium concentration. Heavy lines in the outer section of the case are crystal boundaries and not cracks. Thickening

Case thicknesses on the steels of Table 1 varied from .015 mm to .030 mm after a three hour treatment. An "IR" type steel, used in German chromizing practice (9), (9), accumulated a .06 mm case under identical conditions. This provides an example of greater penetration by the use of a steel having superior chromizing properties. The penetration rates in the steels investigated did not always vary inversely as their carbon contents, because of other variables. In general, however, the presence of carbon in the reductant is essential for case growth as illustrated in Fig. 7 and 8. It has been the practice to hold the carbon content down and/or to strengthen inorganic salt baths with some other strong carbide former.

In a number of runs, cast iron was found to chromize without difficulty, a uniform corrosion-resistant .025 mm thick case being obtained in three hours at 1050°C (Fig. 9). The effect of excessive carbon is partially offset in the case of cast iron by its lower melting point. Decarburization did not influence the chromizing case thickness. Heavy cases were produced on the stainless steel and nickel of Table 1. Molten iron received only .010 mm after 3 hours at 1200°C, and tungsten only .005 mm at this temperature. Results of runs made in the Ajax internally heated furnace were similar to those recovered by Table 1. Chromium chloride and sodium chloride were first melted. Sufficient chromic chloride was then added to produce a 20 per cent chromic chloride bath by reductant and chromic metal. After addition of the chromium, the bath was held at 900°C or below for 12 hours to avoid excessive CoCl₂ loss during the reduction period allowed. For most of this, the temperature was increased to 1000°C and the specimens were introduced. No operational difficulties were encountered. Results were similar to those obtained in the small experimental furnaces. It was necessary to cool specimens in atmosphere on their way out of the furnace to avoid heat stress. Hardnesses on iron were found to be fairly soft (130-180 Knoop), and deformable, confirming previous reports in the literature (10). Although no hardness measurements were made on higher carbon steel cases, these also are reported to be considerably harder.

Some of the materials listed in Table 2 were exposed to the nitric acid test after chromizing. Even continuous exposure to this as .005 mm passed tests of several months duration. Comparisons of cases formed in the salt bath with those formed by the pack method are shown in Table 1.

Table 1. Effect of treating time on case thicknesses of various chromized materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Horsepowertime (min)</th>
<th>Case thickness (mm)</th>
<th>Salt bath method</th>
<th>Park method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armco iron</td>
<td>3</td>
<td>0.020</td>
<td>0.020</td>
<td>0.020</td>
</tr>
<tr>
<td>Armco iron</td>
<td>6</td>
<td>0.035</td>
<td>0.035</td>
<td>0.035</td>
</tr>
<tr>
<td>Armco iron</td>
<td>12</td>
<td>0.055</td>
<td>0.055</td>
<td>0.055</td>
</tr>
<tr>
<td>SAE 1045 steel</td>
<td>3</td>
<td>0.009</td>
<td>0.009</td>
<td>0.009</td>
</tr>
<tr>
<td>SAE 1045 steel</td>
<td>6</td>
<td>0.015</td>
<td>0.015</td>
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<tr>
<td>SAE 1045 steel</td>
<td>12</td>
<td>0.020</td>
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<tr>
<td>SAE 1045 steel</td>
<td>24</td>
<td>0.025</td>
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<tr>
<td>275 Mo, 0.1% C, 0.4% Si...</td>
<td>3</td>
<td>0.008</td>
<td>0.008</td>
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</tr>
<tr>
<td>1.0% Mo, 0.3% C, 0.4%......</td>
<td>3</td>
<td>0.007</td>
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<td>0.007</td>
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<tr>
<td>1.0% Mo, 0.3% C, 0.4%. .</td>
<td>6</td>
<td>0.016</td>
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<tr>
<td>1.0% Mo, 0.3% C, 0.4%. .</td>
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<td>1.0% Mo, 0.3% C, 0.4%. .</td>
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<tr>
<td>25% Mo, 0.1% C, 0.4%...</td>
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<tr>
<td>25% Mo, 0.1% C, 0.4%...</td>
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</tr>
<tr>
<td>25% Mo, 0.1% C, 0.4%...</td>
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<tr>
<td>25% Mo, 0.1% C, 0.4%...</td>
<td>24</td>
<td>0.025</td>
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</tr>
</tbody>
</table>

Allowing for some variations in some instances, the salt-bath method compares favorably.

Estimation of the Diffusion Constant

The diffusion constant D for chromium in Armco iron calculated from the equation

\[ \frac{\partial x}{\partial t} = k \left( \frac{\partial^2 x}{\partial t^2} \right) \]

where \( x \) is case thickness and \( t \) is time, is given graphically by Fig. 10. Assuming the same surface concentration as determined by Hocks (12), \( k \) is approximately one.

No provision has been made in these calculations for batch in D with carbon. Good agreement among values of \( D \) calculated at the same temperature, but different times, was taken as an indication that the concentration of chromium in the surface is approximately constant.

The calculated values for the diffusion constant at 1100°C and carbon were found to be 2.5 × 10⁻⁶ and 9.7 × 10⁻⁶, respectively. These values are of the same order as those obtained by Grobe (13), (i.e., \( D_{\text{melt}} = 8 \times 10^{-6} \) and \( D_{\text{solid}} = 6 \times 10^{-6} \) and \( D_{\text{solid}} = 5.3 \times 10^{-6} \)). The characteristic diffusion curve relating the concentration to time at the absolute temperature as shown in Fig. 10 is an indication of the precision of the experimental values.

A detailed study of the effect of carbon on the solidification of the melt is required in the future. The bath can be operated in a more or less continuous manner so that packing, furnace heating, furnace cooling, and unloading cycles are avoided. Although chromium metal was used in producing chromic chloride in this project, this salt can be more cheaply made from ferrochromium (14), (15). Operation at lower temperatures for shorter times is possible and many of the inherent advantages of heat treating salt baths carry over to the chromizing bath. A principal advantage, compared to pack methods, is the greater ease of CO₂ concentration available.

The effectiveness of the fused-salt chromizing is dependent on the considerable extent, as in other chromizing methods, on choice of material. Although protective cases will form on a wide variety of materials, deeper penetration and better characteristics requires the selection of lower carbon steels (16). Silicon appears to increase the diffusion rate, but specific effects of other elements, alone or in combination, are not well known.

Acknowledgment

The authors wish to express their appreciation to the Air Material Command, Wright-Patterson Air Force Base.
FIG. 5. Iron-chromium temperature-composition diagram

Fig. 7. Shown by Author comparison co-oxidation formation rates, Upper (Fig. 7) is an S.A. 410 steel, adjusted for 8 hours at 1100 C. Lower Steel (Fig. 8) is iron chromiunm for 250 hours at 1000 C. Nital etch, 5X.

Fig. 8. Cast Iron, salt-bath chromized for 5 hours at 1015 C (1900 F). Case depth 0.09 inch (2.209 mm). Pictorial view, X 10.

Fig. 9. Diffusion of chromium in iron Armco.

Fig. 10. Diffusion of chromium in iron Armco.

Any discussion of this paper will naturally assume an ultimate failure of the Suez Crisis of the Transactions of the Society.

References
2. P. C. Kelley, German Pat. 672,113, June 19, 1939.

PERSOANAL NOTES

(Continued from page 7)

Hugh Evans, Jr., 40, a change of address from Aransas Pass, to Tahona, Texas. He is serving in the Complimentary Department of Continental Oil Company, in care of his address, Box 414, Tahona, Texas.


FRANCIS, K. W., Jr., 38, on mission in the States from Lima, Peru, and while there, sent a letter to his friend, Mrs. Anne M. Rink, 1119 Columbus Avenue, Boston, Mass.

E. E. B. Frankland, 69, has a new address in the United States Department of Agriculture, East Lansing. He is serving as Geologist for the United States department.

(Continued on page 35)

THE FUTURE OF GOLD

By U. S. Senator HARRY P. CAIN, Washington, D. C.

Two months have passed since the carefully studied plans, for the supplemen-
tized legions of communism erupted across the 36th parallel in Korea. During that brief period of sixty days this crisis and the entire community of peaceful nations have been sub-
ject to a series of unparalleled shocks. The American people, as tamely
accompanied by the flaming violence of tanks and heavy artillery is always a job to work, who believe in law and order, in peace and justice, in the just
precepts of religion and in the fair
progress of a free society.

I do not exaggerate when I say that the greatest shocks were reserved for Americans. In the first place, the as-
sumption of the Poole murderers came as a complete surprise to a government which had spent billions of one tax-

The simple notion that a high living standard could prevent us from fear — the meanest fear we know of, an enormous capacity to produce steel, and the only ones who have suffered from the power aspirations of our planners. The record also shows that the power has been great, a tremendous and ambitious bureaucracy quite unnecessary for such a moment. The action also shows that since these powers have been granted, the government has both the power and the determination to change the course of the country.

The owners of real estate are not the only ones who have suffered from the power aspirations of our planners. Back in 1933 a succession of emer-

gency demands for their immediate and pressing self-defense have proven in bitter battle to be less than adequate.

The events of the past sixty days dis-

The American public today is

to every citizen and in spite of the deepest conviction that our American friends at some of these urgent young men, as we must

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among the measures adopted dur-

the government of this country was very

self defense have proven in bitter bat-
tle to be less than adequate.

ings spent on social security and soft

life today is a lares et omen and disattributed. It is explained because the challenge to peace in its violent form has come somewhat sooner than was generally expected. It is disattributed because the means for self defense have proven in bitter bat-
tle to be less than adequate.

In the minds of thoughtful Amer-

A new order was created.

The United States was pushed off the world standard by climbing plau-

ners. In a matter of the deepest con-


e analysis of citizens, owed

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selves defense have proven in bitter bat-
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alent of the dollar was fixed at one
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price does not fix your labor costs or
This constitutes an indefensible
tion. This story came from Tel Aviv In
market for the best price which con­
his product which will meet bis costs

Purchasing Power of Gold Decreased
The housewife who spends a dol­
finds that it will buy just
little more than half as much as it bought
of the end of 1933.
With the single exception of gold there is hardly a commodity or serv-
price which sells for today the same
price that it sold for 17 years ago. It
little wonder that the use of gold for jewelry has increased during the
period.
The manufacturer of gold rings and
watches can buy his principle raw material at a fixed pre-war price.
Treasury of the United States inter­
ceeds on his behalf, compels the gold
ago. The Treasury is his product at the
pre-war price of $35 an ounce— and
then pays it at the same price to the
jewelry manufacturer.

The industrial consumption of gold since the end of the war has been
more than double the domestic rate of gold consumption. This
constitutes an indefensible discrimination against the miner and an
unnourished privilege for the manufacturer.
I need hardly tell the gold miners in the audience that gold which
which your gold at an arbitrary price does not fix your labor costs or
enables you to buy material and equipment
at the prices prevailing in Janu­

The maintenance of a $35 price for gold is both unjust and unreason­
just to the men who produce it and are not permitted to expose their products
in the open mar­
ket. For the best price which gold pro­
ders are willing to pay. This denial
of market freedom applies to no other
producer.

It is true that government does step
into certain areas, notably transpor­
tation, communication and power pro­
duction for the purpose of regulating
prices. This is done because the nature
of these industries makes competition impractical. Rates must be established
for the consent of the state authority to
ensure a fair price to the consumer.
But wherever such a price is fixed
the state establishing the price is
because of the great thickness of the
mountain from the porphyry area.
Ore in these slopes is angular, brittle.

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For many years, William C. Browning, consulting engineer of Los Angeles, had been thinking of possible methods for working the property. In 1945, Browning, now vice-president of Round Mountain Gold Dredging Corporation, started an exploration, sampling and equipment-study program which resulted in the plans for the recently completed plant. The final plans combined methods which have recently come into use in the lowest-cost systems of mining, milling, and material handling—gravity, pneumatic, dredge, and mechanical.

The Round Mountain Gold Dredging Corporation was formed to exploit the deposit; it is a wholly-owned subsidiary of Yuba Consolidated Goldfields, Ltd., and the Fresnillo Corporation. F. C. Vass Delver, a man with many years of experience in dredging for Yuba, was elected president of the new company. Round Mountain leases the ground from Nevada Prophyr Gold Mines, Inc., on the basis of a 10-percent royalty on gravels and alluvials and a 6½-percent royalty on lode deposits. The lease covers several thousand acres and runs for 30 years.

Preliminary designs were started in 1947, and actual engineering designs of the plant carried on in 1948 and completed early in 1949. Design work done by Yuba was under the direction of the company's chief engineer, Edgar von Bolhar. Actual construction work started early in 1949. Yuba Integrates the Plant

A plant the size of the one at Round Mountain contains a great many separate pieces of equipment. The Yuba Manufacturing Company, at its plant near Benicia, California, built many of those pieces; but more important, it fabricated the connecting links, the pieces of machinery which tie the plant together. All in all, Yuba fabricated approximately 1,000 tons of machinery. Trusses for the conveyor-belt systems, the crusher car and pendulum conveyor, the trommel, jigs, gold tables, sand wheels, and tailings stackers were all built at Benicia. Yuba proceeded to assign it a boat number just like any bucket-line dredge, and went to work on it.

New System From Gravel Pits

The mill at Round Mountain is now handling about two-thirds of its 17,000-ton capacity: it is worked 24 hours daily. The mine supplies the mill by working on a two-shift basis. A brief description of the mining system follows: With the pit developed, a dusting, working on top of the bank, works ore down into the mill by working on a two-shift basis. The system of mining in the pit, something new to metal mining, was adapted from a practice that has proved itself in west-coast gravel pits in recent years, especially pits in the vicinity of Los Angeles. The require...

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From the crusher car a 42-inch American belt carries the ore to the junction box which routes it westward toward the stockpile. On the pit floor is a pile of boulders too large to pass through the 30-inch grizzly.

From the crusher car end of this stretch of belting, each belt is electrically inter-connected so that they eventually end up on the tailings pile which is far away from the pit.

The hopper car is loaded by a Bucyrus-Erie 170-B 6-yard electric shovel with special 7-yard dipper. The dipper, almost big enough to drive a car into, is equipped for working in 370 feet of water. Carrying approximately 10 tons per trip, the shovel must make 1,700 swings in a 1,000-ton working day.

With its long reach, this shovel works over the pendulum conveyor by 75 feet.

Scourifying Plate—Key Item

The pit at Round Mountain, near 120 feet in depth, will reach a maximum depth of 370 feet. Atop the bank which is carried at a 70° slope, a Bucyrus-Erie 54-B, 9-yard electric shovel is equipped with an 80-foot dipper to reach out over the water. Swinging from the end of the boom is a 7,000-pound scourifying plate with seven teeth which can shed up to 2,500 tons per hour. The dragline works this scourifying plate up and down the bank, hosing it with a waterfall and allowing it to slide down the steep slope to the pit bottom where it is picked up by the big electric shovel.

Because the scourifying operation eliminates the need for blasting, it is a key feature of the Round Mountain system of mining.
Erie 54-B dragline works ore down to the yard electric shovel loads ore into the hopper. Seen here against the background of this dam is unusual in that it might be described as underground. Near Round Mountain, Nevada.

The Round Mountain plant, originating as an idea and a vision some three years ago, is now complete. It is a new combination of methods and equipment, although considered piece by piece parts of it are really new. The world of mining will do well to watch its progress.

FUTURE OF GOLD

(Continued from page 18) Investment could be ignored “because we owe it to ourselves.”

The world of mining will do well to manage our money. Let the dollar and gold find their own levels in a free open market during a limited period of probation. Let the level determined be the true parity between gold and money.

With this rated parity the American holder of currency may again enjoy the right of conversion. Our government may then know that as long as its fiscal conduct commands itself to the people of this country there will be no run on our gold stocks. We profess to be fighting for freedom and justice in Korea, I do not doubt that our money is being used deeply believe this to be so. He is willing to reach into his pocket for added taxes to promote this purpose. I am willing to shed his blood if necessary to serve this cause. Let us beware, lest in our preoccupation with the foe on the other side of the world, unscrupulous thieves of power deprive us of our birthright at home.

THE MINES MAGAZINE • SEPTEMBER, 1950
These are questions I shall attempt to answer. Probably one of the most important considerations is whether or not mining may be able to operate in some fields as efficiently as private industry. I know, for instance, that the mining companies—the mining industry — the prospectors, the Government, the Atomic Energy Commission, the public domain are being made available for existing plants, but to provide ore for new plants, ... The open-pit mines may be able to operate more efficiently as private industry. I know, for instance, that the mining companies—the mining industry — the prospectors, the Government, the Atomic Energy Commission, the public domain are being made available for existing plants, but to provide ore for new plants, the mining industry must keep pace with expanding requirements.

As an indication of public interest which has emerged for domestic uranium production, a program to encourage development of a domestic uranium industry was formed in 1944. This program was terminated in 1948 when adequate supplies of uranium were no longer a problem. By that time the Atomic Energy Commission had spent several million dollars developing the domestic uranium industry. The Atomic Energy Commission for Far East uranium production opened early in 1947.

Promising Projects. In U.S. Interests, interest in finding and developing uranium resources continues to be keen. The Atomic Energy Commission announced in July 1950, that 15 individual mining operations entailing a total of 55 men, and a large part of the ore was from Colorado. A recent report to the Atomic Energy Commission by the United States Geological Survey, has been a "best seller." Since publication in May 1949, nearly 40,000 copies have been sold.

Promising Projects. In the search for uranium, the Atomic Energy Commission recognized the importance of finding the right combination of resources. This is a critical factor when adequate stocks have been found in Colorado, Utah, Arkansas, and several other states. The Commission is making available new mill facilities in various parts of the country to encourage the development of promising prospects in several regions. The Commission has a large number of transfers of mining claims to various companies, and is doing all it can to encourage the development of promising prospects in the United States.

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FLOTATION AND CYANIDATION TESTS ON A GOLD-COPPER SULFIDE ORE FROM COOKE, MONTANA

By A. L. MOFFETT and H. J. HEINE

INTRODUCTION AND SUMMARY

Many western ores containing gold, silver, and copper are treated on a profit only when the recovery of these metals is high and treatment costs are low. Usually, ores containing easily oxidized copper minerals, or copper minerals that become volatile to some extent during oxidation during cyanidation, present a real problem in cyanidation. Copper-copper compounds are formed that have a tendency to precipitate and that cannot regenerate cyanide and metallic copper. Cyanide compounds are formed that are oxidized during treatment, present a problem in cyanidation. By the second method of treatment, cyanidation was found that cyanide consumption could be minimized by By the second method of treatment, cyanidation was found that cyanide consumption could be minimized by the period of agitation of 4 hours. Apparently, longer cyanidation periods resulted in increased cyanide consumption by the process of oxidation of the sulfide minerals present in the pulp. The short cyanidation period was long enough to permit satisfactory extraction of gold.

Acknowledgment

The cost service of this report was done under the general supervision of J. B. Sardina, superintendent of the Elko and Precious Metals Experiment Station, Division, Bureau of Mines, Reno, Nev.

Previous Tests [1937]

In 1937 a correspondence received from the MacLaren Gold Mines Co. concerning this work, previous testing done at the Reno Station under Project 270 was mentioned. A search of the records revealed a record of the test dated October 27, 1937, describing results made on a similar but higher-grade ore from the same property. The results of this previous testing were of interest, and include procedure and results obtained with the lab tests. The previous results were summarized in the report of Project 270, as follows: See Table 1. Recovery of the gold and over 80 percent of the silver were recovered in a low-grade concentrate by full flotation of the minus 100-mesh product.

Table 1

<table>
<thead>
<tr>
<th>Recovery of Gold and Silver (%)</th>
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<tbody>
<tr>
<td>Low-Grade Concentrate</td>
</tr>
<tr>
<td>High-Grade Concentrate</td>
</tr>
<tr>
<td>Total Recovery</td>
</tr>
<tr>
<td>Gold</td>
</tr>
<tr>
<td>Silver</td>
</tr>
</tbody>
</table>

The second method of treatment consisted of production of copper concentrate in a similar manner, followed by flotation of part of the pulp. The copper tailings amounting to only 20 percent of the original ore were sent to cyanidation. These secondary concentrates were reground, washed to facilitate cyanidation, and cyanide consumption was considerably lower. The cyanide consumption decreased to 2.5 pounds per ton of copper.

Acknowledgment

The work described in this report was done under the general supervision of J. B. Sardina, superintendent of the Elko and Precious Metals Experiment Station, Division, Bureau of Mines, Reno, Nev.

The 

New Gardner-Denver New Model 

Gardner-Denver New Model 

"HER" Airblast 751

The new Gardner-Denver Model "HER" Airblast is the result of many years of research and development. The HER Airblast combines the features of the HER (High Efficiency Regulating) and the HER (High Efficiency Regulating) with the "HER" (High Efficiency Regulating) and the HER (High Efficiency Regulating) model to provide a perfect combination of features. The HER Airblast is available in a variety of sizes to meet the needs of different applications. The HER Airblast is designed to provide the highest level of performance and reliability. The HER Airblast is available for use in a variety of industries, including mining, construction, and manufacturing. The HER Airblast is also available for use in a variety of environments, including indoor and outdoor use. The HER Airblast is designed to be easy to operate and maintain, making it a perfect choice for any application.

The HER Airblast is equipped with a powerful motor that provides a high level of performance and reliability. The HER Airblast is also equipped with a variety of features that make it a perfect choice for any application. The HER Airblast is available in a variety of sizes to meet the needs of different applications. The HER Airblast is also available for use in a variety of environments, including indoor and outdoor use. The HER Airblast is designed to be easy to operate and maintain, making it a perfect choice for any application.
Unanswerable
Allis-Chalmers Redesign Motors
Allis-Chalmers has announced the design of a line of large, bracket-bearing,uger-cage induction motors of four and more poles to provide more production and greater accessibility.

The motors, designated the "Astro" series, are designed for use in Allis-Chalmers induction motor construction in this Allis-Chalmers plant. All parts are ground to 600 mesh; a tolerance of 0.001 is maintained. For ratings of 250 to 500 HP per HP per HP, an economical unit is provided in this line.

For further information, write Allis-Chalmers, 1402 South Edison St., Milwaukee, Wisconsin.

Goodyear Makes Personnel Changes
M. W. Stedman, who has been named to the position of executive assistant to the president, will move to the new facility in the company's corporate offices. He has been with the company for more than 20 years and has held a number of positions in various divisions.

A. B. WALTER

Goodyear, a native of Uly, NY, joined Goodyear in 1932 following his graduation from Cornell University. He has been with the company since 1917 as a page boy.

General Electric's "More Power to America Special" Soon to Start Second Leg of Nationwide Tour
The "More Power to America" Special, the General Electric Company's mammoth display of electric production and industry, headed west from Schenectady September 5 on the second leg of its nationwide tour.

The ten-car exhibit train will visit 27 key midwestern industrial centers, stop before swinging south, down the Atlantic coast, according to C. H. Lang, vice president and manager of the G-E Appliance Department.

Mobilization Planning Committee formed in G-E Appliance Department
The formation of a Mobilization Planning Committee within the General Electric Company has been announced by H. H. Edlen, vice president and general manager of the department.

The committee, under the chairmanship of H. H. Edlen, is to reorganize for the mobilization program of the Department of Defense and its agencies.

New Caterpillar Tractor Plant
First steel erection at the new Caterpillar Tractor Plant at Dallas, Ill., began August 8, according to T. W. Fisher, president.

The new plant at Dallas marks an additional expansion of manufacturing facilities with which it is planned to achieve the greatest possible economy in the manufacture and distribution of Caterpillar products. In addition to its main plant at Peoria, Ill., the company has Plants at Dallas, Calif., and Paris Depot at San Leandro, Calif., and has a second plant at Kansas City, Kansas; Dallas, Texas; and Paris Depot at San Leandro, Calif.

Caterpillar Tractor Co., 1250 Cowles Ave., Minneapolis, Minn.; speaks, Washington, D.C.

C. C. SMITH

M. W. SLEDGE

H. R. HARRINGTON & L. THORNTON

(Continued on page 44)
EXECUTIVE COMMITTEE MEETING

The regular meeting of the Executive Committee, Colorado School of Mines Alumni Association, was held in the Alumni office on Monday, August 21, 1950.

The meeting was called to order at 7:00 P.M. by President Colasanti.

Roll Call

Members present: James Colasanti, President; Robert Evans, Secretary; Donald E. Collister, Treasurer; Robert McGloin, Committee chairman; Addison Manning, Harry McMichael, Lynn W. Storm, Executive Manager, Frank C. Bowman.

Minutes of the previous meeting, July 17, 1950, were read and approved.

President Colasanti called for the Treasurer's report and the reports of the standing committees, as follows:

Treasurer's Report

Mr. Collister reported that financially the picture is about the same as at the same period last year. The Association showed an operating loss in July 1950, however, for the first seven months of 1950 it shows a net profit.

Moved by Mr. Collister the report be accepted; seconded by Mr. Storm; passed.

Budget and Finance Committee

No report.

Instruction Committee

No report.

Legislation Committee

No report.

Membership Committee

Mr. Bowman reported for Mr. Botts that the Salt Lake City chapter will have a breakfast for Mines Men during the American Mining Convention. The breakfast will be held at the Salt Lake City Hotel.

Public Relations Committee

Mr. Bowman announced that the Alumni Endowment fund showed receipts during July of $93.10, leaving a balance of $5207.73.

The Placement Service showed receipts of $199.50 during July 1950 and disbursements of $310.06, leaving a balance of $3099.67.

Moved by Mr. H. E. Colwell the report be accepted; seconded by Mr. McGlone; passed.

Nominations Committee

Mr. Bowman reported that the ballots have been printed and should be mailed by September 1, 1950.

Public Relations Committee

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Moved by Mr. H. E. Colwell the report be accepted; seconded by Mr. McGlone; passed.

A Thousand Students

were expected on Mines campus by the close of registration the 12th of this month. William V. Botts, registrar and director of admissions, said the total would be approximately 47.5% of the available class time that has been filled. In the past, Mines has been 12th in the Rocky Mountain region in terms of total enrollment. The Dean of Men described the process as "an exciting one." The selection of students is made by the end of the first term and 1060 for the second term. They are: Ted Bergstrom, Chicago, Ill.; Walter Butler, Battleville, Okla.; Kent Kilmer, Midland, Texas; and John A. Masks, Sarasota, Wynn.

Alumni Business

(Continued from page 34)

Dr. Paul F. Bartunk, instructor of graduate and undergraduate courses in geophysics, has joined Mines faculty this month at the opening of the fall term.

He will hold the rank of associate professor in the school's enlarged physics department, President John W. Vonderwelle said in announcing the appointment. Bartunk is a new addition to the first time in its history, Mines is offering graduate courses in physics. Head of the department is Dr. V. Allan Long.

Bartunk's teaching experience extends over a number of years at prominent institutions including the Rensselaer Polytechnic Institute at Troy, New York.

He received his doctor's degree from the University of Michigan and for two years and one-half months during World War II he was employed by the U.S. Bureau of Standards.

He is the author of a number of technical publications and a member of the Lehigh University Alumni board.

In addition to helping develop graduate courses in physics, Dr. Bartunk will serve as instructor for a portion of the 250 students who each year study formerly contained in the geology department.

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GREAT LAKES
Franklin W. Mazur, '43, President, B. D. Far-
sall, '77, Vice-President; Stanley Oliner, '48,
16 State Street, Denver, 7-Colo, Meetings upon
call of Secretary.

HOUSTON
Allard L. Ladd, '27, President: McKay G.
Walker, '37, Secretary-Treasurer, Box 4013,
2017 Stockham, Houston, Texas. Meetings up-
on call of Secretary, 1st Thursday of each month.

KANSAS
All activities suspended.

MANILA
John R. Wagner, Jr., '42, President; Brenda C.
Bergman, '21, Vice-President; Mr. and Mrs. B.
Forster Sarren Bldg, Manila, P. I., Luncheons sec-
dond Saturday every month of the year.

NEW YORK
Domingo Velez, '22, President; Fred D.
Cardinale, '31, Secretary; 425 Broadway, New York 13, N. Y., Telephone 4212.

NORTH CENTRAL TEXAS
E. J. Prox, '23, President; J. W. Peters, '28,
3239 South Main St., Dallas, Texas; Telephone
2237. Meetings second Monday of each month.

OKLAHOMA
Carl R. Halogen, '23, President; M. E. Chumney, '27, Secretary-Treasurer, 1627 East
max, Oklahoma City, Oklahoma, Meetings upon
call of Secretary.

SOUTHERN CALIFORNIA
J. J. "Moby" Maquigan, '19, President; H. M. "High" Haskell, '42, Vice-President; Mrs. H.
"Ruby" Haskell, '42, Secretary-Treasurer, P. O.
Station G, San Diego, California, Meetings upon
call of Secretary.

TEXAS
Samuel M. Eshleman, '48, President; Ar-
thur W. Kirkwood, '30, Secretary-Treasurer, 91-76th, Fullerton, Puyallup, Meetings upon
call of Secretary.

WASHINGTON, D. C.
Marc G. Greger, '34, President; Frank E.
Johnson, '28, Vice-President; 101 W. 20th St.,
Washington, D. C., Meetings upon call of Secre-
tary.

WETLAND Large Bar or Pebble Mill
Good Condition National Titanium Co. Vernon, California

WANTED
Mines Alumni Association, was held in the garden of
Mr. and Mrs. George S. Krueger, 307 Church Street, Brownsville, Texas, 78520.
It was held to succeed F. M. Belleau.

ARIZONA
Fred E. Duthler, '28, President; Luther P.
Knight, '47, Secretary-Treasurer, Box 2, Globe, Ariz. Meetings upon call of Secretary.

BAGUIO
J. E. M. Volin, Albany, Ore., 1933; Donald R. Siljestrom, Butte, Mont., 1935; Theron E.
Hansen, 407 Midland Tower, Midland, Texas. Meetings upon call of Secretary.

BIRMINGHAM
Robert J. Blake, '29, President; Stanley M. Weller, '21, Vice-President; Mrs. E. I. Sedgey, '40,
1719 Diamond Ave., Birmingham, Alabama, Meetings upon call of President; Visiting "Miners" please contact secretary.

CENTRAL OHIO
Robert E. Blow, '34, President; Fred M. Stover, '28, Secretary-Treasurer, Bub-
tle's Memorial Institute, Columbus, Ohio.

CENTRAL WYOMING SECTION
Herbert Schildt, '34, President, Lynn D. Eberhardt, '39, Secretary-Treasurer, Box 320, Big Bird Oil & Gas Co., Casper, Wyoming. Meetings upon call of President, 1st Monday, June, Septem-
ber, December.

CLEVELAND
Joseph F. Gilbert, '45, Secretary, 155 North-
thirkland, Ariz., 1932; Cleveland, Ohio. Meetings the first Monday of each month at the Center Club, Cleveland.

COLORADO
E. S. Harkey, '24, President; Herbert W. Hunt, '10, Secretary, 1621 Market Street, Denver, 18, Colo., Meetings upon call of Secretary.

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FROM THE Local Sections

PACIFIC NORTHWEST

A. R. Kittinger, '46, President; 2159 Holgate, Seattle, Phone FB-7292, W. S. Waldman, '40,
1504 S. Lewis, Seattle, Meetings upon call of Secretary.

PELORUS OHIO SECTION
John E. Hatch, '26, President; Robert W.
Shepherd, '24, Secretary, 12510 Forest Hill Rd.,
New Kensington, Pa. Meetings upon call of Secre-
tary.

PERMIAN BASIN
Norman E. Maxwell, '17, President; Perry A.
Gill, '36, Vice President; Mr. and Mrs. J. T.
Ritter, '14, Secretary-Treasurer, 3rd Floor Soriano Bidg., Manila, P. I. Luncheon second Sat-
urday every month of the year.

WANTED
Large Bar or Pebble Mill
Good Condition National Titanium Co.
Vernon, California

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SOUTHERN CALIFORNIA
John Riegel, '36, President; A. J. Hauser, '43, Secretary-Treasurer; Mr. and Mrs. F. W.
Kraus, '25, 651 Sherman St., Denver 3, Col-
orado Keystone 4973

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METAL TREATING & RESEARCH CO.
James Colten, 35
601 Sherman St, Denver 3, Colorado
Phone 4972
Commercial Heat Treaters — Consulting Metallurgical Engineers
High performance of tools and mechanical products through selection and treat-
ment.

ARKANSAS
Paul F. Driver, '22, President; 725 Park Ave., Little Rock, Ark., Meetings upon call of Secretary.

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FORDHAM COLORS

SPORTS MARCH

By BILL ANDERSON

FOOTBALL SCHEDULE

Sept. 16 at Nebraska State Teachers — Night Game.
Sept. 20 at Chadron State Teachers — Night Game.
Sept. 29 at Nebraska Wesleyan College — Night Game.
Oct. 7 at Colorado College.
Oct. 14 v. at University of Omaha — Night Game.
Nov. 4 at Nebraska State Teachers.
Nov. 11 at Adams State.
Nov. 18 v. at Western M. S. College.

"It won't be long now," are the by words for Football enthusiasts throughout the land, and Head Coach Coach Rennock and staff are well aware of the time limitation. The Blasters will open against the Nebraska State Teachers at Chadron, Nebraska, on September 16. Fifty-seven seniors were "limited" for reports for drills September 1. Twenty-one lettermen were expected to return from the 1949 Mines team that was runner-up to Colorado College in the final standings of the Rocky Mountain Athletic Conference.

Last week's activities changed the lettermen in ten places, but two of the other lettermen are also available for real duty in Fall. This team include Bill Dunn, 190 pound undated heavyweight boxer, John Volosin, 176, and Herb Treaden, 175, both 1948 team. Ed Turner, 177, a Junior college transferred from California will make sure big for starting a quarter. Bill Watts, 178, a squadman last year will also return. Up from the Freshman squad are Kent Dunn, 175, Carl Krueger, 170, Guffe Menogan, 177, Donald Allen, 175, and Tom Wyman, 175. Max Settleman will not return from the 1949 team.

Tackle—Bob Johnson, 195, and Paul Hamilton, 186, are returning letter winners at the Tackle position. Squadman John Avul, 190, will again be available. Dick Borden, 207, a place kicking specialist will be available from the Freshman team. Bill Cooke, 186, and Joe Rebec, 184, Lot's four lettermen and two others by the scholastic make the tackle position the hardest hit.

Guard—The Guard position is almose as well shuffled as the tackles with four lettermen returning: namely, Don Adames, 160, All Conference at Sophomore; Walt Arnold, 175, Dick Arnold's younger brother, John Miles, 185, and Bill Trelfa, 190. Bob Howard, 175, is the brightest prospect up from the Freshman Squad and will make a strong bid for a starting berth. Other Sophomores are Andy Jurand, 165, Roger Peck, 160, and Ross Treaden, 175, who made rapid progress toward the end of last season, will be in contention. Other Squadmen are Gerald Jefferies, 150, and Bob Peters, 175.

Center—Groat, 165, is the only letter winner among the centers. Lloyd Benton, 173, 190 last year and Bob Critchlow, 179, a Junior College transfer this year, and Dick Thomas for the starting assignment. Also returning are Bob Morgan, 190, and Walter Stiltz, 160, from the 1949 team.

Backfield—Dave Brown, 175, and Dewel Lee, 160, are letter returners for the wingback and center. Carl Dunn, 175, a Junior college transfer, should see lots of action. Bob Enerson and Ed Gaulke, will help here.

Fullbacks—Bob Marsh, 185, a transfer and Wally McGregor, 165, a Squadman last year are the top candidates for Fullback duties. Ed Zinlowski, 182 pound letterman and a line backer delver, may see some action this year. Chuck Young, 175, the Senior in 1946 gives added strength to this position. Bob Menogan, 190, is up from the Freshman squad yet again. Squadman Bob Fitch, 160, will also return.

Tailbacks—Letter winners Bob Johnson, 161, and Bob Peters, 155, are in a three way battle with Ray Everett, 155, with the starting tailback position. The Backfield, which was expected to shape up average above has been fault less consequently with the loss of Dick Jack, All Conference Halfback, and Ray Evans, the All Star Halfback, who were recently called to active duty with a Colorado National Guard unit. The fullbacks are in good hands with Dick Bend returning at this spot.

POSITION COMMENTS —

Ends—Leading the parade of ends is Claude Jenkins, All conference select at Sophomore in 1949. He is one of the other lettermen also available for real duty in Fall. They include Bill Dunn, 190 pound undated heavyweight boxer, John Volosin, 176, and Herb Treaden, 175, both 1948 team. Ed Turner, 177, a Junior college transferred from California will make sure big for starting a quarter. Bill Watts, 178, a squadman last year will also return. Up from the Freshman squad are Kent Dunn, 175, Carl Krueger, 170, Guffe Menogan, 177, Donald Allen, 175, and Tom Wyman, 175. Max Settleman will not return from the 1949 team.

Backfield—Dick Bensch, 180, a Second Team All Conference Selection for the past two seasons lends as a top candidate for Fullback duties. Ed Zinlowski, 182 pound letterman and a line backer delver, may see some action this year. Chuck Young, 175, the Senior in 1946 gives added strength to this position. Bob Menogan, 190, is up from the Freshman squad yet again. Squadman Bob Fitch, 160, will also return.

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An advertisement for the September, 1950 issue of the Mines Magazine.
Steel Mill to Install Suburbus Frequency Change Set

One of the largest frequency change sets ever built by the General Electric Company for use at Claycomo, Pa., works of Jesse and Langhorne in the production of carbon black, will be installed in the new plant. This installation includes three 300-kw. generators with 3000-volt excitation and with a total capacity of 900 kw. The frequency change set will be used to change electric power which is being fed to the existing-bottles due to the increased need for process area.

Single Cylinder Turbine

Positioned for Jeep

Great Lakes Bulk Carrier

The latest single cylinder turbine designed especially for low speed service, the Great Lakes Bulk Carrier is being built by the General Electric Company for the National Bulk Carrier Lines. The equipment is scheduled to be delivered to the company and can be in regular service in the 1963 season.

Link-Belt at the Iron and Steel Exhibition

Cleveland, September 26-27-28

The exhibit which will occupy spaces 17-18-19, will feature Link-Belt conveyors for handling everything from raw materials to finished product, and the company's complete line of power transmission products.

An extra-special feature will be the Link-Drive, a new, advanced System, depicting the mechanical handling of raw materials. The Link-Drive can handle short, irregularly-shaped material, and has been specially developed for use in the steel industry.

The power transmission displayed will include large worm gearing, 2400 kw. copper and laterally re-actuated speed drives; a large roller bearing unit with vertical-buu good torque; and a small roller bearing unit that can be made as a perfect drive.

Catallog Review (Continued from page 42)

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