MORSE “TRUELINE” CLASSIFIERS

A Revelation In Mechanical Achievement

MORSE “TRUELINE” CLASSIFIERS incorporate many mechanical improvements and advantages long needed in the mining industry. The absence of cams, rollers, cables and other excessive parts has greatly improved mechanical performance and consistently reduced maintenance.

Long “TrueLine” strokes cause a maximum sand discharge with only negligible power transmission. The smooth and uniform rake movement maintains a quiescent pool surface. Thus providing a consistently uniform mesh of overflow for more efficient treatment in the subsequent metallurgical circuit. A simple rake elevating device is included with each classifier.

Simplex and Duplex styles for a variety of capacities

WRITE FOR BULLETIN NUMBER 407

An Outstanding Advance In Classification

MORSE BROS. MACHINERY CO.
P.O. BOX 1708
DENVER, COLORADO, U.S.A.
HEAD, WRIGHTSON & CO., LTD.
STOCKTON-ON-TEES, ENGLAND

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NEW YORK CITY
HEAD, WRIGHTSON & CO. (S.A.) LTD.
JOHANNESBURG, SOUTH AFRICA

ESTABLISHED 1898

NORTH AMERICAN BRANCH:
ROBINS CONVEYING BELT COMPANY
PASSAIC, NEW JERSEY
YUBA MANUFACTURING CO.
231 California St., San Francisco, California

MANY A FOUNTAIN PEN HAS BEEN SHELVED

... that would lead a useful active life if given half a chance! Many a major pen annoyance is the direct result of some minor pen disorder ... that can be corrected, mended, or adjusted at little cost by our Pen Doctors. Our Pen Clinic is really something to talk about ... factory-trained specialists, a complete stock of spare parts for practically every make of pen on the market, and service that’s speedy and guaranteed. SO LET’S PUT THE ARMY OF UNEMPLOYED FOUNTAIN PENS BACK TO WORK!
PERSONAL NOTES

George D. Couch, Jr., ’35, who has been in Bishop, California, as mine shift boss for the U. S. Vanadium Company, has been transferred to their plant at Uray, Colorado.

Philip P. Arnt, ’34, accompanied by his wife and young son, returned to Denver last month. He resigned his position with the New York & Ohio-Bailey Mining Company of San Joaquin, Honduras, to accept one with Stearns-Roger Mining Company in Denver. His present mailing address is 794 S. Ogden Street, Denver.

J. M. R. Rebec, ’35, is now associated with the Denver-Canyon Corporation at La Grange, Peru, serving in the capacity of junior metallurgist.

George D. Couch, Jr., ’35, has returned to the States from Bolivia where he was engineer for the Compania Minera y Agricultura Obrero de Bolivia. He has been addressed at his home, 4222 N. Ashwood, Chicago, Ill.

J. N. Benton, ’35, who has been doing exploration work in Brazil for the past year, has returned to Denver with wife, 20th Ave. S.W., Washington.

Steven S. Detman, ’31, Consulting Engineer, has changed his address to Arcadia, California.

Carl E. Demant, ’31, is now being addressed as Williamson, Pennsylvania.

J. H. Davis, ’35, who has been in general manager for the Native Silver Mining Company.

T. L. Donelson, Ex-26, formerly associated with the Cooeya Peninsula Company, is now engineer for The Texas Company at Arapahos, Yucatan, Mexico.

Walter J. Eaton, ’31, Consulting Engineer of San Juan Capistrano, California, who was a Denver visitor last April.

John F. Emerson, ’35, resigned his position with the San Juan Company as the first, California, to accept position of chemist with the American Smelting & Refining Company at the Camp Historic Plant. His new address is 2131 Ashwood Street, Arcadia, California.

Hank Estabrook, ’35, was in Denver for a few days last month from his duties at the Canyon Corporation at Deadwood, South Dakota.

Wendell W. Ferris, ’25, who is now a junior in equipment, is mining engineer for the mining industry of Elise Co. Has been assigned to the assistant mining company at the largest producer of salt in the Philipines. His address is Box 119, Tashmore, Lye, P. I.

A. E. Fleischman, ’31, is shaft boss for the Kaysville Mine Company at Salt Lake City, Utah.

Charles C. Grilich, ’35, who has been in “Address Unknown” for some time, has finally been located at 220 Texas Street, Houston, Texas.

J. E. Glandon, Jr., ’25, has changed his address to 524 No. 5th Street, Pine-}

Deadwood, S. D. He is now employed by the U. S. Navy department as assistant inspector of naval docks. Part of his duties is the inspection of the Gamma Ray at roughing mills. He is now in the north of the dredging work, and is skilled in the use of the Michigan. H. H. Head, ’35, mine engineer for the Homestead Consolidated, has been called at Homestead, Colorado, as the death of his wife, mid-winter of April.

PERSONAL NOTES

L. Ruth Harrison, Jr., ’38, resigned his position as metallurgist for the Phosphatic Recovery Corporation at Mulberry, Florida, to accept that of production manager with the Phoenix Recovery Corporation at Malvern, Arkansas. Their organization is a major enterprise in the phosphatic recovery industry in the United States.

Robert W. Harrison, ’35, petroleum engineer for the Parsons, Brinckerhoff, and Brinckerhoff, has returned to Texas from Arizona, California, and has his residence at 1219 Second National Bank Building, Houston.

Sterling S. Neffey, ’35, has completed his contract work with the Continental Oil Company at Venustiano, Ltd., and has returned to his home, 317 F Avenue, La Habra, California.


E. C. Kirk, ’35, who recently returned from a trip to Brazil, passed through Denver recently and called at the Alumni office. He resides at 1106 S. 26th Street, San Francisco, California.

George D. Leslie, ’33, who recently returned from a trip to Mexico, arrived in Denver recently and called at the Alumni office. He resides at 2942 N. E. 131 Avenue, Portland, Oregon.

John J. Lofland, ’31, engineer for Minera La India, writes that the company address has been changed to Larragana, C. A., where he is now residing. He is a year and a half ago, has been increased from 125 to 300 tons a year. He and Mrs. Lofland are enjoying the new living quarters which have recently been completed and they like the country.

H. M. Otterson, ’37, is now residing under the name of the Willow Creek Mill at Minera La India, Mexico.

Joe McBrian, ’23, has resigned as mine manager of the Minera La India, Mexico, and has returned to his home at 1312 Lincoln Street, Bremerton, Washington, where he will receive mail at Box 248.

Jack D. Mullinax, ’38, geologist for the Paita Company at La India, Nicaragua, where he is now residing, has been changed to Larragana, C. A., where he is now residing. He is a year and a half ago, has been increased from 125 to 300 tons a year. He and Mrs. Lofland are enjoying the new living quarters which have recently been completed and they like the country.

Joe McBrian, ’23, has resigned as mine manager of the Minera La India, Mexico, and has returned to his home at 1312 Lincoln Street, Bremerton, Washington, where he will receive mail at Box 248.

Philip R. Asel, ’34, accompanied by his wife and young son, returned to Denver last month. He is now residing with the U. S. Navy Yard as ship draftsman at the shipyard, and is living in the house at 1209 Second National Bank Building, Houston.

George D. Leslie, ’33, who recently returned from a trip to Brazil, passed through Denver recently and called at the Alumni office. He resides at 2942 N. E. 131 Avenue, Portland, Oregon.

Prize Winner – March 1940

The author is the winner of the prize for the best story in Picture magazine's contest to find the best story in the month of March. The prize winner is Mrs. Stephen J. Brown whose letter appears elsewhere in this issue. The winner will receive one year free subscription to MINES Magazine.
Your letters are welcome for publication in this column every issue. Send along your biographical data, your career, your problems, your criticisms. You like to read them and so do others. There are a good start; let's hear from others.—Bill.

John T. Paddleford, '33

Strategic Mineral Supplies
By G. A. Boush

Keep your eyes on the strategic minerals story and take an interest in them now. In the last few years we have heard a great deal about the importance of these materials in the war effort. It is important that we understand the importance of these minerals and how they play a role in the war effort. It is important that we keep track of the supply of these minerals and how they are being used in the war effort.

For sale at the Mines Magazine, Denver, Colo.

The Mines Magazine

VOLUME XXX MAY, 1940 NO. 5

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Front Cover

The Mines Magazine. One of the principal productions which the Carlton Tunnel will churn. This mine has produced $100,000,000 in gold.

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Official organ of the Colorado School of Mines Alumni Association. Copyright 1940. Address all communications relating to Mines Magazine to Frank C. Bowman, Editor, 734 Cooper Building, Denver, Colo.
Mine drainage in Cripple Creek has been a problem since the early days of the District. Most of the shafts encountered large flows of water before they reached any considerable depth, and pumping has always been a troublesome and expensive handicap to mining in this district. From measurements of the flow of water encountered in the Roosevelt Tunnel, it is estimated that each vertical foot of breccia area contains not less than 50,000,000 gallons of water in storage.

It was not many years until various tunnels, such as, the Moffat, Hilland, Standard, and El Paso were driven. These various tunnels gradually drained the district down to their respective levels. In 1907 the larger mining companies operating in the district, financed and started to drive the Roosevelt Tunnel. This tunnel drains the various mines of the district to an approximate elevation of 6990 feet, or 1120 feet below the present drainage level of that property. The grade will be ±0.3%.

The portal of the Carlton Tunnel is located nearly 2 miles south of the town of Cripple Creek and Victor, near the junction of Cripple Creek and Oil Creek. The portal elevation is 6893 feet. Its course is N49° 54'E and the main drive will be 32,000 feet in length to a position under No. 2 Portland, at an approximate elevation of 6900 feet, or 1120 feet below the present drainage level at that property. The grade will be ±0.3%.

To accomplish complete drainage for the Cresson and Vindicator, two laterals will be driven from 4,500 to 5,000 feet each. The approximate depth mined, below the lowest workings in the larger mines is as follows: Cresson 700 Feet, Ajax 500 Feet, Vindicator 1,000 Feet, and Portland 200 Feet. The tunnel will be driven almost its entire length in granite. Brecchia will be encountered near the end. The granite is extremely hard and tough; it is uniform and has very few fracture joints.

The first 300 feet had to be supported. Originally it was 8½ feet by 9 feet but at present it is 11 feet by 10 feet, including a 4 feet 6 inch radius circle arch. The finished tunnel size depends on the type of ground encountered.

The first part of the tunnel was driven with conventional steel. Detachable bits are now used; however, to date it is not sure which is the cheaper. Both bit and steel costs are very high owing to the extreme hardness of the granite. Drill steel is 1½ inch hollow round with standard lugged shanks, cut in 3, 5, 7, and 9 foot lengths.

Drilling is accomplished by five, 3½ inch automatic feed, sliding case drilling machines, equipped with steel centralizers. These five machines are mounted on a drill jumbo. The jumbo designed and built in the Cresson Shops, is 20 feet long and weighs about 5 tons without machines and steel. Machines are not dismounted when moving the jumbo, the vertical columns are left in position and the arms swing back parallel to the tunnel. Five minutes are required to get all machines running after the jumbo reaches the face. Additional machines may be mounted on the side of the jumbo for claddings.

A jumbo crew consists of five machine men, four chucks tenders, one
Shifting Jumbo Carlton Tunnel.

The mines magazine * MAY 1940

Drilling Carlton Tunnels showing set-up of five machines.

THE MINES MAGAZINE * MAY 1940

Compressed air for drilling and mucking is supplied to the face by six inch steel tubing, welded into 60 foot lengths at the portal. One of these lengths is installed, using flanged joints, in less than ten minutes, usually during the moving of the jumbo or mucker. The flanges are designed, forged and made at the Cresson mine shops. One 1800 cubic foot and one 1000 cubic foot compressor furnishes air for underground and surface use. Air pressure is 120 lbs. at the compressor or about 115 lbs. at the machine, while running.

No serious water problem is anticipated before a point 25,000 feet from the portal has been reached.

A water ditch is carried on both sides of the track. This ditch is made by raising the track back of the face and slipping 4" x 6" plank under the edges of the ties. Muck from the sides is then shoveled into the center for track ballast.

For shifting the jumbo from the main track, after drilling is completed, a station is slacked from the side of the tunnel some 30 feet in length, by means of a jumbo shifter which consists of two Eimco placed 15 feet apart and supported by expansion pins in the back. The beams support small cars carrying air cylinders. From the piston rod of the cylinder is suspended a hook arrangement that clamps on both sides of the jumbo frame. With this arrangement the jumbo is easily and quickly shifted from the main track. The mucking machine is shifted in the same manner.

The surface plant consists of an office, change room, fan house, compressor plant, blacksmith shop and powder magazine.
The average daily and total monthly footage is as follows:

<table>
<thead>
<tr>
<th>Month</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>January</th>
<th>February</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>182 ft.</td>
<td>170 ft.</td>
<td>160 ft.</td>
<td>150 ft.</td>
<td>140 ft.</td>
<td>130 ft.</td>
<td>120 ft.</td>
<td>110 ft.</td>
</tr>
</tbody>
</table>

Some statistics during March:

- 390 rounds were shot, or an average of 7.06 rounds per 24 hours, pulling 7.9 feet per round.
- The powder consumption was 38.6 lbs. per one foot.
- Average drilling time per round was 1 hour 56 minutes.
- Average mucking time per foot of tunnel was 1 hour 35 minutes.
- Average mucking time per foot of tunnel driven was 11.0 minutes.

Average number of cars mucked per foot of tunnel was 1.69 cars.

Average time for mucking one car was 6.5 minutes.

Average number of holes drilled per round was 34.6.

Average number of caps used per foot was 4.5.

Average cost of material needed per round was 24.7 Lb.

Average cost of caps used per foot was 3.5 Lb.

Average cost of material needed per foot of tunnel was 7.9 Lb.

Average cost of material needed per foot of tunnel driven was 11.0 Lb.

Statistics for March, 1940

- NUMBER CAPS USED: 246
- MUCKING TIME: 246
- 191 rounds were shot, or an average of 7.06 rounds per 24 hours, pulling 7.9 feet per round.
- The powder consumption was 38.6 lbs. per one foot.
- Average drilling time per round was 1 hour 56 minutes.
- Average mucking time per foot of tunnel was 1 hour 35 minutes.
- Average mucking time per foot of tunnel driven was 11.0 minutes.
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Chinese and 2,000 mixed-race nationals; a total of 16,000 inhabitants.

In Tahiti, under the French rule and according to French custom, there are no class or racial distinctions. The happy, joyous and childlike disposition of the Polynesians make them as much a part of the social life of the island as the French officials and their families themselves.

The most popular gathering place on the island is “Quinn’s Cafe”, which, is I think, one of the renowned cabarets of the world. The atmosphere in this cafe is by no means the same as in this country. The sham and veneer of sophistication is entirely lacking, being replaced by the whole-hearted, spontaneous gaiety of the Tahitians. One soon catches the spirit of the occasion and if he so desires is accepted by the natives without question or formality.

After two hours of dancing and singing to the accompaniment of torrential rain beating on the corrugated iron roof of the building, one of the natives said “You're most home”. The clouds cleared away and the sun came out bright and clear and so with a few of my Tahitian friends we started out on bicycles toward the “Districts” or country. Riding along the road, the trees forming overhead a canopy of green and scarlet, and among these brown skinned natives, it seemed that surely I was in a dream. After riding about one mile along the sparkling blue lagoon we turned toward the mountains into a veritable jungle of tropical trees and undergrowth. A few scattered huts in one of the “Districts” were “home”, where I met more natives no less charming and beautiful than my friends. To one of the native girls, explained the social standing of her family, and of which were apparently generations of Polynesian culture and traditions, and that her name was also that of a royal ancestress. All this she told in an English-French-Tahitian jargon for which the music of the Tahitians.

The task of obtaining the coconuts was a fascinating procedure. With the use of a strong back from the polynesian tribe tied around each foot and forming a strap about eight inches wide, he hoisted himself up the tree at lightning speed. The amount of pure joy derived by them from romping and shouting like children was amazing.

The dancing became faster and faster, first the men in the center, the women circling around, and then the men on the outside. The dancing ceased, the music stopped and the natives began to dance. First to a slow rhythmic chant started the girls. A never to be forgotten occasion and if he so desires is accepted by the natives without question or formality.

Slowly and in an atmosphere of perfect peace and quiet, the strumming of ukuleles and guitars began, and the singing of that sweet, haunting Tahitian tune.

Ave, ave, tahi nui, E ratia tuna, e pases reo, Ave, he, free, away to fish by torch light.

The faint, sweet scent of jasmine and heliconia truly the magic of the South Seas.

When the day of departure arrived I rode into Papeete with a feeling of sadness and regret. I wondered how far, or how little, I had really penetrated into the lives and customs of these people. At the departing ship among many good-byes, and tears that no one tried to hide we left our friends, I was loaded with "leis" about my neck and had many gifts of fruit, beads and souvenirs. The boat pulled away from Papeete into a sunset of a thousand shades of lavender and purple. Somewhere on the deck below an accordion was playing, Ave, ave, tahiti, and a lump rose in my throat as it always will when I hear that tune. With the fading of the tropical sunset, Tahiti was left behind, and with me I carried away a beautiful memory.
RECOVERY OF NICKEL COPPER AND PRECIOUS METALS FROM DOMESTIC ORES

BY THE COMBINED ELECTROTHERMAL AND ELECTROLYTIC METHOD

By J. Koster,
R. G. Scholz,
O. C. Garst,
T. R. Evans,
and W. E. Cody

Introduction

In 1938 the Electrometallurgical Section of the Metallurgical Division, Bureau of Mines, began an active investigation of methods for recovering nickel, copper, and precious metals from ores of the Bunkerville district in Clark County, Nev. The Bunkerville ores are of a type similar to that of the Sudbury, Ontario, Canada, nickel deposits. At present, only a small tonnage of ore has been exposed in the Bunkerville region, and there is decided need for organized prospecting and development work there. It was believed, however, that the deposits were sufficiently significant to warrant intensive investigation of their mineralogical possibilities.

A 500-pound sample of the 300-foot level of the Key West property in this district was taken by one of the authors2 and Dr. Leo, mining engineer, International Smelting & Refining Co., Bunkerville, Nev. The analysis of this sample showed 1.65 percent nickel, and 2.50 percent copper.

A previous 45-ton sample of the ore taken from the Key West property in 1903 was reported2 to contain 1.8 percent nickel, 2.3 percent copper, and 0.14 percent platinum-group metals per ton. The geology of the Copper King mining district, Bunkerville section, has been reported.3

The second largest nickel-producing organization in the world at this date is the Falconbridge Nickel Mines, Ontario, Canada. A brief resume of this company's (1915-38) operations is given here because it may be of value to the development of similar nickel-copper deposits. The Falconbridge deposit, which is 15 miles long by 10 to 150 feet wide, was covered by a deep mantle of glacial sand and gravel. The mineralization was indicated originally by magnetic surveys and was proved by extensive diamond drilling in 1916 to a depth of 580 feet.

In looking over the records of the initial diamond-drilling of this one body, it was found that in the 29 holes reported at depths of 50 to 587 feet, the nickel-copper content ranged from 0.20 to 5.00 percent. There is a striking number of core samples that contain no copper and 12 to 15 samples that contain only traces of nickel. The ratio of nickel to copper varies much more than the total content of the latter; that is, a hole 154 at 53-foot depth shows a trace of nickel and 0.45 percent copper per, while at 56-foot depth the same hole shows 2.38 percent nickel and no copper. Only 3 samples out of more than 200 are both values together.

These records resulted from the preliminary or exploratory ventures herein mentioned only because at this time the Bunkerville district is in the same stage of development. In 1928-30, the Falconbridge Co. started its first ore-reduction plant, which separates the concentrate and ore converter. The daily charge (24 hours) was 100 tons of ore. This was probably high-grade ore selected from its mining development, reported to be 3 percent combined nickel-copper. One ore sample and values are tabulated in table 1.

Table 1 shows that from 1928 to 1935 the reduction-plant capacity was increased from 100 to approximately 1000 tons per 24 hours. The ore-reserve figure increased 1.4 times in the same period. In 1936 the Falconbridge Co. started its first ore-reduction plant which as of the end of 1937 contained 3 million tons of 3-percent nickel-copper ore. This ore reserve is considered an economic basis for investment in a reduction plant of 1000 tons per day. The average nickel-copper ore was considered an economic basis for investment in a reduction plant of 1000 tons per day. The average nickel-copper ore is tabulated in table 1, which shows analyses of the 300-pound sample taken from the ore reserve. The ore sample contains 13.5 percent nickel-copper ore. Nickel and copper are floated selectively from the ore sample.

The above analyses are not to be taken as representatives of the entire ore reserve. It was determined by the ore taken from the particular location described above, upon which the experimental work was based in this report was done.

Concentration of Bunkerville Nickel-Copper Ore

The purpose of this work was to prepare enough concentrates to carry on subsequent smelting and refining investigations.

The base-metal minerals of value in the Bunkerville district, additional work is anticipated on the selective flotation of the p r o b l e m. Representative analyses of the two grades are given in table 5.

Several tests were made to float the preliminary sample. The micro-run ore contained less than 2 percent nickel-copper, was crushed to minus 200 mesh, ground and in a mill for 1 hour. Nickel and copper were not recovered from the flotation concentrate.

Data on representative pilot-plant and mill tests are given in table 7.

On the basis of preliminary tests of this nature, the 55-ton sample was run through the mill for the quasi-production of the tests. A typical screen analysis of the flotation concentrate after 1 hour of grinding in the mill is shown in table 7.

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TABLE 7.—Typical screen analyses of flotation and smelting.

<table>
<thead>
<tr>
<th>Mesh</th>
<th>Percent</th>
<th>Cumulative percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 65</td>
<td>1.84</td>
<td>1.84</td>
</tr>
<tr>
<td>65 - 140</td>
<td>13.28</td>
<td>13.14</td>
</tr>
<tr>
<td>140 - 200</td>
<td>6.05</td>
<td>19.19</td>
</tr>
<tr>
<td>200 - 300</td>
<td>5.73</td>
<td>24.92</td>
</tr>
<tr>
<td>300 - 400</td>
<td>31.35</td>
<td>56.27</td>
</tr>
<tr>
<td>400 - 500</td>
<td>31.35</td>
<td>87.62</td>
</tr>
<tr>
<td>500 - 600</td>
<td>9.42</td>
<td>97.04</td>
</tr>
</tbody>
</table>

The results of a representative flotation test on the 500-pound grab sample are given in table 8.

TABLE 8.—Preliminary flotation tests of nickel-copper ore.

<table>
<thead>
<tr>
<th>Concentrate</th>
<th>Heads</th>
<th>Second froth (10 min.)</th>
<th>Tails</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ni</td>
<td>0.26</td>
<td>0.21</td>
<td>0.66</td>
</tr>
<tr>
<td>Cu</td>
<td>0.51</td>
<td>0.46</td>
<td>1.40</td>
</tr>
<tr>
<td>S</td>
<td>2.94</td>
<td>2.75</td>
<td>3.12</td>
</tr>
<tr>
<td>Fe</td>
<td>0.17</td>
<td>0.16</td>
<td>0.33</td>
</tr>
<tr>
<td>Silica</td>
<td>2.75</td>
<td>2.50</td>
<td>5.25</td>
</tr>
<tr>
<td>SiO₂</td>
<td>13.17</td>
<td>12.97</td>
<td>26.14</td>
</tr>
</tbody>
</table>

TABLE 9.—Flotation pilot plant daily run, March 1953.

<table>
<thead>
<tr>
<th>Date</th>
<th>Cu, Ni</th>
<th>Concentrate</th>
<th>Cu, Ni</th>
<th>Heads</th>
<th>Second froth</th>
<th>Tails</th>
<th>Copper</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>5,000</td>
<td>0.35</td>
<td>0.51</td>
<td>0.34</td>
<td>0.34</td>
<td>0.34</td>
<td>0.34</td>
<td>1.5</td>
</tr>
<tr>
<td>24</td>
<td>5,000</td>
<td>0.29</td>
<td>0.63</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
<td>1.3</td>
</tr>
<tr>
<td>25</td>
<td>4,000</td>
<td>0.51</td>
<td>0.31</td>
<td>0.97</td>
<td>0.97</td>
<td>0.97</td>
<td>0.97</td>
<td>2.1</td>
</tr>
<tr>
<td>26</td>
<td>5,500</td>
<td>0.50</td>
<td>0.43</td>
<td>1.82</td>
<td>1.82</td>
<td>1.82</td>
<td>1.82</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Electrothermal Reduction of Rhyolite Nickel-Copper concentrates to White Metal.

The flotation concentrates produced by the pilot plant were of the following composition:

<table>
<thead>
<tr>
<th>Element</th>
<th>Pounds per ton</th>
<th>Copper</th>
<th>Nickel</th>
<th>Iron</th>
<th>Sulphur</th>
<th>Silicon</th>
<th>Magnesium</th>
<th>Alumina</th>
<th>Silver</th>
<th>Platinum</th>
<th>Palladium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ni</td>
<td>5.92</td>
<td>0.62</td>
<td>0.10</td>
<td>0.19</td>
<td>0.07</td>
<td>0.15</td>
<td>0.08</td>
<td>0.03</td>
<td>0.01</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td>Cu</td>
<td>1.40</td>
<td>1.40</td>
<td>1.40</td>
<td>1.40</td>
<td>1.40</td>
<td>1.40</td>
<td>1.40</td>
<td>1.40</td>
<td>1.40</td>
<td>1.40</td>
<td>1.40</td>
</tr>
</tbody>
</table>

Most of the rest was MgO. The present grade in the nickel-copper converter lining would also prevent the economic production of less than 0.5 percent Fe in the converter product.

When operating as a smelting furnace, 750 kilowatt-hours were used per ton of charge. Approximately 400 pounds of charge fumed with 16 percent of the matte was smelted from the converter. Preliminary experiments showed that low slag compositions of the sintered concentrates retarded ignition of the matte in the small converter; consequently, it was decided to smelt raw concentrate.

Mattes produced by the electro-thermal smelting of raw concentrates were compared with sintered concentrates, and the data are given in table 12.

The blowing temperatures ranged from 1,000° to 1,500° C. Water was used to maintain the bath temperature. The convenience of the three-way joint on the support for (Continued on following page)
GeoLOGICAL ASPECTS OF THE COLORADO-BIG THOMPSON PROJECT

By

Ross H. Kneat
Geologist
Bureau of Reclamation

The Colorado-Big Thompson Project is a massive undertaking designed to harness the waters of the South Platte River for the purpose of providing a reliable water supply for the growing needs of the Colorado Front Range and adjacent areas. The project involves the construction of several large dams and reservoirs, as well as a series of tunnels and canals to transport water from the source areas to the points of use.

The project is located in the northern Rocky Mountains, where the terrain is characterized by a combination of rugged peaks, deep valleys, and broad valleys. The water supply is derived from the melting snow and glaciers that cover large portions of the region during the summer months.

The project is estimated to cost several billion dollars and is expected to provide water for irrigation, municipal and industrial use, and hydropower generation.

The project has been the subject of extensive planning and engineering studies, and has involved the collaboration of numerous agencies and organizations. The project is expected to be completed in several stages, with the first dam, the North Clear Creek Dam, scheduled for completion in 2023.

The project has had a significant impact on the local economy, providing jobs and opportunities for local residents. It has also had environmental impacts, including changes to local ecosystems and impacts on wildlife.

The project is an example of the intricate balance between human needs and natural systems, and serves as a reminder of the importance of careful planning and stewardship in the development of natural resources.
both physically and chemically, and
are thereby given lubricating qualities
which cause the whole mass to behave
as a viscous liquid under great
pressures.
Minor shear zones, from 20 to 50
feet wide, are quite numerous along the
tunnel line. From 2½ to 3 miles
east of the west portal there is a zone of
quite closely spaced narrow shear
zones alternating with solid rock.
Crushed rock and altered feldspars,
as well as gouge material, were noted
in several places. Prospect Canyon
fault zone, 3 miles west of the east
portal, is a quite severe zone of shearing
for more than one-half mile. It
will nearly all be in granite. Much
crushing, alteration of feldspars and
mineralization are present in the por-
tions exposed at the surface. There
are also considerable widths of fairly
solid rock with no more serious
deformation than closely spaced joint-
ing. In an effort to determine the
effect of the faulting at depth, two
core holes were drilled to tunnel
level. The core established the presence of the disturbed
zone without question but there was
only a very small percentage of badly
altered rock. The percentage of core
recovery was high. The two holes
were drilled to depths of 1100 and
1150 feet and tested a horizontal dis-
tance of approximately 800 feet which
was, of course, only a small portion
of the total width of the zone. The
conclusion was reached that no seri-
ous trouble should be encountered in
the 800 feet tested but that this was
no reason for being too optimistic re-
garding the remaining 2000 feet.

Engineering Aspects:
The tunnel will be 13.06 miles
long, of circular section, nine feet nine
inches in diameter inside the concrete
lining. The gradient will be eight
and one-third feet per mile.

The engineer is, of course, inter-
ested in many factors not strictly geo-
logical such as the accessibility of
portals, costs of materials and their
transportation, number of adits, time
limit for completion, labor conditions,
etc. Since the Continental Divide
tunnel will be through the area of
Rocky Mountain National Park, it
must be driven entirely from the two
portals at Grand Lake on the west
and Wind River on the east. This is
the only tunnel of this length to be
driven without shafts and unusual
problems of spoil transportation,
ventilation and other factors are in-
volved.

The engineer is interested in the
kind of rock only as regards its
properties of strength, drilling condi-
tions, powder requirements, tendency
to air-slake, etc. Rocks to be pene-
trated in the Continental Divide tun-
nel, if unaltered by faulting, shearing
or underground solutions, are strong
and will present little difficulty.

Interest must therefore be centered
on the extent to which the rocks have
been affected by these processes.

Little criteria exist for the correla-
tion of observed conditions on the
surface with those encountered in tun-
nels. Advantage was taken of limited
opportunities which were presented
for making such comparisons at
Moffat, Jones Pass and Twin Lakes
tunnels. At the Moffat tunnel, the
Ranch Creek fault zone was examined
on the surface at Rifle Sight Notch
and the same zone was examined
where exposed in the tunnel during
the relining process by the City of
Denver. At Jones Pass tunnel a
careful examination of the surface
conditions was made and periodic
trips were made to the tunnel during
construction. These observations in-
fluenced the estimates of conditions.
to be expected in the Continental Divide tunnel.

From surface mapping, 5200 feet of the course of the tunnel was estimated to have been affected by faults and shear zones. Allowing for additional faults which may not show at the surface plus ground on each side of such faults which may have been affected, a total of 6000 feet was the figure used as an estimate of the distance requiring strong support plus that to be classified as "heavy ground," capable of necessitating extreme measures for control. From experience in Jones Pass, Moffat and Twin Lakes tunnels, it was estimated that an additional 17,000 feet would need light support. It has been found that surface observations are not of much value in determining distances likely to need light support since they include areas in the vicinity of fault zones, areas affected by closely spaced jointing or occasional slip planes in areas in which there may be splitting along cleavage planes in schists. Estimates must therefore be based on past experience in other tunnels. Much of the light support is necessary only as a safety factor in protection from rock falls, etc., in ground where little, if any, pressure is exerted against the timbers or steel ribs.

Seismic Survey:

In Gilchrist Basin near the exit portal, two miles of the tunnel line are covered by a thin mantle of glacial drift. The ground surface is 450 to 350 feet above tunnel level. In order to be certain that the drill did not extend to those depths a seismic refraction survey was made with stations every 500 feet. The resulting bedrock profile showed a minimum of 225 feet of rock above tunnel grade. The profile was later tested by drill borings. The results are tabulated as follows:

<table>
<thead>
<tr>
<th>Hole No.</th>
<th>Bedrock depth to bedrock, feet</th>
<th>Actual depth to bedrock, feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hole No. 1</td>
<td>250</td>
<td>246</td>
</tr>
<tr>
<td>Hole No. 2</td>
<td>310</td>
<td>321</td>
</tr>
<tr>
<td>Hole No. 3</td>
<td>125</td>
<td>238</td>
</tr>
</tbody>
</table>

It will be seen from this table that the results were remarkably close in the first two holes. Some large boulders were encountered in the third hole at about the depth designated on the seismic profile as bedrock. It is unlikely, however, that a layer of boulders would be present in glacial drift of sufficient extent to constitute a high velocity medium for seismic waves. On account of surface topography the seismic stations at this point were located 50 feet south or up the slope from the tunnel line.

The tunnel line was later changed to the north to accommodate the change in location of the east portal. Hole No. 3 was drilled on this new line at a distance of 160 feet from the seismic station diagonally across the old profile line. Since there are many steep or vertical cliffs in the vicinity, the most logical explanation seems to be that the seismic determinations were on top of such a cliff, bordered on the east by glacial drift, and that the hole was drilled at its foot. In any event there is ample rock roof above tunnel grade.

GREEN MOUNTAIN DAM

Green Mountain dam is the only one now under construction in the Colorado-Mt. Thomson Project. It is proposed to outline the geology of the site and to describe the part geology has played in the original investigations and in the construction to date. A more complete description of the regional and local geology may be found in the Bulletin of the Colorado Society of Engineers for the months of November and December, 1939.

The dam will be a rolled earth and rock-fill embankment with a height of 270 feet above stream bed and will form a reservoir with a capacity of 152,000 acre-feet. The dam crest will be 7860 feet above sea-level. The remaining features of the dam and power plant are described in detail by S. F. Cerullo in the October and November issues of the Bulletin of the Colorado Society of Engineers, 1939.

Geology:

The Green Mountain Canyon was cut by the Colorado River through a laccolith, leaving Green Mountain on the east and Little Green Mountain on the west. The intrusive porphyry, which forms the core of the laccolith, extends continuously across the river between the two mountains. Both up and down the river the porphyry is in the form of sills which have been forced into the sedimentary rocks for various distances. Such an intrusion at the dam site is near the mouth of the canyon (Fig. 2). The formations involved are the Middle and Lower Dakota and the upper Morrison, the coarse-grained sills of porphyry both above and below (Fig. 4). Both the sills and the sedimentary rocks dip at low angles upstream. The lower sill emerges from the river bottom adjacent to the foot of the dam and rises downstream, forming a box canyon (Fig. 5). The base of the upper sill rises to a height of 90 feet above the river bottom which is the cause of the thinning of the sill away from the central laccolithic mass. The formation of the dam and as much as 100 feet at points under the proposed spillway. It consists of glacial till, a mixture of materials ranging in size from rock flour to huge boulders. The content of fine material is such as to give the material remarkable qualities, rendering it suitable, with the exception of the boulders, for the compacted, rolled-fill section of the dam.

On the right (north) abutment the overburden consists of porphyry tills mixed with soil which covers large deposits of glacial gravel. The latter are especially abundant near the transept excavations (Figs. 8 and 9), where the thickness of the glacial material is in excess of 70 feet and the layer of talus only 8 or 10 feet. At other places to the right of the abutment the overburden is nearly all talus and is as much as 40 feet thick. Thin layers of the gravels have been reworked by stream action and were erroneously identified as river deposits when found in test pits.

In the river bottom the gravels are only six to eight feet thick where they lie on Morrison shales and even less where erosion has cut into the lower porphyry sill.

Investigation:

Green Mountain Canyon is two and one-half miles long and there were four possible dam sites to be considered. Topography was taken in the bottom of the canyon with cross sections at the most promising looking sites and the whole canyon was mapped geologically. A site was selected near the upper end of the canyon because it was more favorable than the others from the standpoint of yardage and accessibility, proximity to material as an origin of stream level and geological structure. All of the geology was mapped. This site was mapped in detail, both topographically and geologically, the latter being on a scale of 100 feet to the inch. Twenty-five pits and drills were dug to determine the thickness and nature of overburden and the kind and condition of bedrock. Geologic cross sections were then constructed along the lines of the axis, the outlet tunnel, the spillway and the main cutoff wall, showing the results of testing. After a visit by Bureau engineers it was decided to continue the investigations farther downstream. Some of the pits had
shown excessive overburden. Two of the drifts had encountered bedrock at 45 and 69 feet without getting through the overburden. Twenty-four more pits were dug at the lower site and although the overburden was heavy in spots there was bedrock at the surface on the axis in the bottom of the canyon and rock at the surface in which to begin the excavation for the gate chamber shaft. This site was finally chosen and 12 diamond drill holes were put down to test the foundation materials along the spillway, at the powerhouse site and in the river bottom and to explore the line of the outlet tunnel.

During the investigation a geologist was stationed at the site at all times. He logged the holes, sampled the material and prepared daily reports which were sent to the Design Division. He also prepared final logs and located new holes or test pits when necessary.

The results of testing, together with all other information, were assembled and used in preparing the final report covering all the known geological data on the site. The report and accompanying drawings are being used extensively during construction.

Construction Materials:

Above the left abutment the surface slopes gently upward to the southwest and is covered by a thick mantle of glacial till similar to that described on the abutment. This was explored by 22 test pits at roughly 500 foot centers. The material was screened, weighed, and sampled, and the samples were tested in the Denver laboratory. It was found suitable for use in the impervious zone of the dam except for the necessity of screening. Materials for the pervious and semipervious zones will be taken from the gravels of the right abutment and from the overburden at the powerhouse and outlet channel excavations, and if necessary, from other sources. Rock for rockfill and riprap will be secured from the screened boulders of the embankment borrow area, and from the porphyry excavation of the powerhouse and outlet channel sites.

Many gravel and sand bars occur in and along the river. There are also at least three higher levels of river terraces containing large gravel deposits. These were sampled and tested, but were found to contain excessive amounts of shale fragments, a condition not surprising in view of the fact that Blue River runs in a shale valley for 25 miles above the dam site. These deposits were therefore rejected as concrete aggregate. In some of the higher (older) terraces local pebbles and boulders. Deposits of sand and gravels in a terrace of the Colorado River valley, near Kremmling, were tested and found very excellent. They were processed and hauled to the dam site for use as aggregate in all concrete work.

Construction Features:

During construction an effort has been made to record all geological data disclosed by stripping or excavation. A map is to be prepared showing the distribution and structure of all rocks in the foundation which have been uncovered by stripping as well as in excavations for spillway, outlet works, powerhouse and cutoff walls. A drawing has been completed showing the geological plan and profile in the outlet tunnel and shafts, geological description and a record of the support found necessary (Fig. 7).

The object of this work is threefold. First, to assist in determining any changes in design or construction made necessary by unforeseen conditions which may have been disclosed by excavation but not by pre-construction testing; second, to preserve such information as a part of the permanent record of construction in order to facilitate repairs or alterations made necessary by possible structural weaknesses; third, to aid the geologists and engineers in their interpretation of observed conditions in future investigations. In the case of Green Mountain dam this is especially important because the formations involved here, the Morrison and Dakota, are the same as will be found in the foundations of five other dams.
With the projection downward of the Kota sandstone extended up to elevation a matter of fact the alternating sand-cliff above, was taken for bedrock. As of porphyry, with a surface coinciding of the trashrack structure. This was however, showed the upper porphyry was prepared upon completion of the testing program. This cross section, that the geology agrees very closely ment unnecessary except to mention sites on the eastern slope of the Continental Divide.

Descriptive matter in the tunnel drawing (Fig. 7) makes further com­

THE MINES MAGAZINE * MAY 1940

Complete New Line of Taylor Recorders. To provide companion recording instruments for their comprehensive line of Pulsometer Controllers, the Taylor Instrument Companies. Racine, Wis., have just released their new recorders for temperature, humidity, pressures, load, rate of flow, liquid level, and receivers for perpendicular transmission systems. Resistive of the controller mechanism, the recorders and recording controllers are identical.

Details of the machines as well as many typical installation jobs are shown in a new illustrated folder, Form 881, copies of which are obtainable from the Taylor Instrument Company, 1250 Race Washington Avenue, Madison, Wisconsin.

New Office Building Robins Conveying Belt Company. The old Park Row Building in New York City has been torn down to make way for the tallest building in the world, and has in its place the 42 stories and 740 rooms occupied for more than forty years by Robins Conveying Belt Company.

This concern, under the leadership of Thomas Robins, pioneered the Belt Con­

THE MINES MAGAZINE * MAY 1940

Enico-Finlay Loader The simplicity and ruggedness of the Model 12-B and Model 21 Enico-Finlay Loaders minimizes the number of wear­ing parts and reduces maintenance ex­

THE MINES MAGAZINE * MAY 1940

WITH THE

Manufacturers

EQUIPMENT NEWS

Enico-Finlay Mine Car Loader Model 21.

Eimco-Finlay Loader Model 21-B.

Eimco-Finlay Mine Car Loader Model 21.

The simplicity and ruggedness of the Model 12-B and Model 21 Enico-Finlay Loaders minimizes the number of wear­ing parts and reduces maintenance ex­

THE MINES MAGAZINE * MAY 1940
The hose is available in the following categories: pervious to the action of the solids it is and age resisting, black rubber compound. Designed to carry. Reinforcement is provided with a rubber-tired cord, making a cord from moving and travelling smooth and a high speed all-weather rubber that will not damage hard-surfaced roads.

New House. Style T. B. Lentl, for use on equipment for spraying paints, Dies, lagers, bench for details of all equipment and manufacturers. Mechanical's Division of The Kinney, 777 & Rubber Company, Akron, Ohio.

The hose is especially adapted for handling of hot water, carbon tetrachloride, drying oils, lacquer thinners, turpentine, etc. The hose in the foreground is 12 feet in diameter and weighs 14 tons. The large V-belt driven hose shown on the other side has 21 grooves. It has a pitch diameter of 177 inches and weighs approximately 18 tons.

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Alumni Council Meetings
APRIL, 1940
Alumni Council Meetings were held in Los Angeles, Calif., on April 11th, Mr. & Mrs. W. C. Cramer, of Leadville, and Mr. & Mrs. J. W. Caggins, of Denver, were elected to fill the vacancies on the Board of Trustees, which had been vacated by the resignations of Mr. & Mrs. J. W. Caggins, of Denver, and Mr. & Mrs. J. W. Caggins, of Leadville.

Membership Chairman.
Mr. Volk reported that the Executive Committee had been notified of the resignation of Mr. & Mrs. J. W. Caggins, of Denver, and Mr. & Mrs. J. W. Caggins, of Leadville.

Treasurer's Report.
Mr. Volk reported that the Executive Committee had been notified of the resignation of Mr. & Mrs. J. W. Caggins, of Denver, and Mr. & Mrs. J. W. Caggins, of Leadville.

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FROM THE Local Sections

BAGUO

W. T. Graham, Sn.-2d; President: C. W. Berry, '36, Secretary, Box 299, Baguio, P. I. Dinah meets on an A., Thursday each month, Fina Hotel, Baguio.

BIRMINGHAM

Tenney C. Beall, '06, President; W. C. Cheek, '36, Vice-President; Hubert E. Bishop, '37, Secretary, 5th Creek, Alabama. Meetings upon call of secretary.

BAY CITIES

Frank Meyareg, '32; President, William J. Bayse, '27, Secretary-Treasurer, 114 Hillgirt Circle, Oakland, Calif. Four meetings per year, 2nd Monday, March, June, September and December.

The Bay Cities section held its spring meeting on April 18th at the Engineers' Club in San Francisco. The meeting commenced with a lively "ball" session and reunion with old friends, many of whom had not seen each other for years. Everyone commented upon and enjoyed the excellent meeting place and delicious dinner.

The meeting was called to order by Frank Hayward, President of the section group. Since new officers will be elected at the next meeting, C. K. Villand, '29 and D. J. Lyons, '31 were appointed to act as Nominating committee to select candidates for the year 1940-41.

An advertising committee was created for the purpose of obtaining advertising for the Mines Magazine. Men were selected who are in a position, through their daily business, to make contact with advertising prospects. Those chosen for this committee were: P. J. McGuire, '15; R. S. Coulter, '19; G. W. Schellenberg, '12; and G. G. Goodwin, '20.

It is planned to extend this committee in the near future, with the objective of placing Mines men in every section of the widely scattered district represented by the Bay Cities Alumni. The superior quality of Mines Magazine, in relation to comparable publications, was mentioned, it was brought out that, through the procurement of an advertisement, the advertiser, the magazine, and the local section all profit; a good way to make friends for the School of Mines!

A drive will be launched to initiate the establishment of a Bay Cities Scholarship Loan Fund. Some bold war has already been made in this direction through the contribution of surplus treasury funds at the end of each year. So far the funds have been most insignificant, therefore any contributions are to be solicited. The members of the Bay Cities Section are going to give it until it hurts for this very worthy cause.

R. S. Coulter, '19 introduced as our guest Ross Travis of Fontana, California, as a prospective Mines man for the Bay Cities Section to use in a scholarship for a scholarship. No one commenting on any details or successes of Ross, everyone was most interested in the whole purpose of the Bay Cities Section. The time devoted by Ross to Mines work was most rewarding to all.

The next meeting, which will be on May 10, in conjunction with the dinner party we are planning for the visiting Senior Class of Petroleum Engineers.

BARCELONA

K. D. Tryg, '36, President; R. J. Malo, '32, Secretary-Treasurer, 7021 Locust Ave., Cleveland Heights, Ohio. Meetings upon call of Secretary.

C. L. French, '13; President; Ben W. God- box, '37, Secretary, General Correspondence, Linden, N. J. Meetings upon call of secretary.

The New York section appears to have had a麻醉 after the big February meeting. The March meeting, held at our office on March 12, was but a "crowd" of three members, namely, Harry Wall, C. L. French, and John McAuley. Moreover, the April meeting was only slightly more promising as regards attendance, there being seven members present. It is hoped that more Miners will come out for future meetings.

After an excellent dinner in the main dining room at the Western Universities Club, an informal business meeting was held. The most important item to be brought out was a proposal to make the New York Section Loan Fund more widely available. The money in this fund has not been used extensively over the last ten years and it is disappointing that more students have not made application for use of this money. We were unable to make a definite decision as to any change in the administration of the fund because of the limited number of members present.

Those present at the April meeting were:

A. F. Duggleby, '13, President; Ralph Reeder, '31, Secretary, Box 297, Manila. Dinner meeting, first Friday each month.

BOSTON

Dent L. Lay, '16; President, R. J. McGil- and, '37; Vice-President, A. L. Macaulay, '36, Secretary, 410 E. 11th St., Denver, Colo. Lunch meeting, third Friday each month.

The Houston Chapter held its regular monthly meeting on Friday, April 11, at 7:30 P.M., in the Cistern of the Lamar Hotel. The attendance was as follows:


Douglas was a newcomer to our group, having recently opened an office in Houston for the Seismograph Service Corp.

Mr. Ball is a student who is getting experience with the Universal Exploration Co., inc.

We are planning on having our next meeting which will be on May 10, in conjunction with the dinner party we are planning for the visiting Senior Class of Petroleum Engineers.

The Oxford Hotel on Denver's Main Street

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Tiled Tubs and Showers

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Headquarters for Mines Men
"Award Day" was presented to John Seeman by the finest bunch of men I have ever worked with in my fifteen years of coaching football. The Great Scholarship Cup, donated by former Dean Lester S. Grant, was presented by Dean Morgan to the Beta Theta Pi fraternity for having the highest scholastic rating of the freshmen, their average being 3.62.

The Tau Beta Pi award to the outstanding sophomore was presented to John Branden in Randall Taylor, president. The prize was a membership in American Chemical Society.

The program ended with the introduction of Joe Hirtz, president-elect of the Student Council, a selection of the Glee Club and the showing of movies of Mines football team in action.

The Special Problems course, Met. +11, was designed to cover a period of ten weeks. Undergraduates will normally complete this course before entering the mining industry. The primary objective in employing young engineers is to develop operating men, principally foremen and superintendents.

Undergraduates, preferably men who have completed their freshman year, will be given underground work during their first summer vacation. If they wish to work for the company during their other vacations with the objective of joining the company upon graduation, they may be given other jobs planned for graduates.

The Geology Department has secured thirty airplane photographs of the region that they are working in. This service will be of great value in any line of their field work.

The photographs are part of those taken in the nation wide survey by the Forest Service. When the survey is finished the government will be able to construct maps and use these photographs for orientation purposes when they get to the Lyons region.

Robert K. Johnston, graduating student in Petroleum engineering, has reached the John Seeman award in the American Chemical Society by Professor Baxter for meritorious work in Chemistry. The prize which Professor Baxter awards each year is based on the quality and quantity of work a student has done at the institution as indicated by the total of quality points earned in the subject of chemistry.

The work of Mr. Johnston has been among the best. He has had a straight "A" record in Chemistry except for two courses in which he received "A" grades.

Head of Tau Beta Pi, Mr. H. E. Spalding, is to make a grant on Mines' campus next month. He was interested in a discussion with the Tau Beta Pi chapter and faculty members at the University of Colorado and is to make two campus speeches and other special meetings in the organization as a whole.

From the Mines Magazine May 1940
LLOYD MAIDEN
The track team under its new coach, Adam Easington, will complete its season this month with a record of fair success. The team has two more meets this month and will probably win a first or two and place second and third in the remaining meets. The team has one meet to its credit, April 20, when Mataya won first in the foil match at the state meet and Sheep took third. John R. Evans, '23, President; D. H. Peaker, '32, Secy.-Treas., c/o The Carter Oil Co., 1501 S. Broadway, Bartlesville, Okla.; T. F. Ansell, '25; R. H. Clarke, '17.

Bartholomew
While Mines Men in Bartlesville, Oklahoma, have been holding monthly luncheon meetings recently. One of these days they will be sending in regular reports and maintaining their own chapter which will be a link to the Tulsa group. Those who have been in attendance are: B. H. Hinkle, '31; R. E. Maxwell, '47; J. W. Baldwin, '21; L. Scholl, '35; Kamen, '31; W. H. Coates, '26; A. F. Beck, '25; R. H. Clarke, '17.

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TRAVEL TRAILS TO ALL AMERICA

Moe and Rogers

Richard Moe and Harley Rogers excited considerable comment from the Colorado School of Mines fans during the past year because of their ability in sports events. When two men display such extraordinary ability in their sophomore year the coach is encouraged to plan for the future. Moe and Rogers are the kind of men a coach longs to see on his team. Both men come to Mines with the background and practical experience so necessary in any engineering school and especially a school with the rating of Mines.

It was only natural that Moe should follow in the profession chosen by his family. His grandfather, a mining man for many years, his uncle, Philip Cox, is a mining engineer with the Bradley interests on the West Coast, and his stepfather, J. E. Hare, is known in the petroleum industry and was formerly interested in the California Petroleum Company.

After he graduated from the Los Angeles High School, Moe attended Black-Fox Preparatory and then Southern California University for a year. While at S. C. he began playing tackle under Coach James H. Jones. He played for Mines in 1938 and took his place on the football team as a tackle. The team, however, was not making Mines' 1939 football team champions is well known to followers of the Rocky Mountain Conference and the position of Mines.

The team was defeated by Greeley on May 15, 1939, by an epidemic of leg injuries. Joe Jones, mine guard, was on the sidelines; Hueckel, winner of last year's state meet in the 100 yard dash, is a popular man with the women, but this fact does not bother Moe too much. He is a student body is proof of their quality.

Harold Rogers gained much of his ability in entrance examinations in engineering school is to be given. Field courses will also be offered in plane surveying and mine engineering.

Summer School Summer study in a vacation land has been the emphasis in the literature announcing the Colorado School of Mines summer session. Dean Jesse R. Morgan, director of the summer session, has announced that courses will be given during a seven-week period beginning July 15 and ending August 31.

Courses of collegiate grade in chemistry, civil engineering, descriptive drafting, English, geology, mathematics, metallurgy, and physics are to be offered. In addition work in mathematics, chemistry, and physics is to be made available for those who wish to take it.

Rogers has that pleasing personality so characteristic of the southern states. He has many friends among the faculty members and students at Mines. He is working for a degree in petroleum engineering and in all probability will do well in this field. He says he will and who can doubt his word.

Those two men are typical of the kind of athletes you find at Mines. No snub courses are offered for athletes and the football player, basketball player, track man carries no load to add the rest of the school. The fact that the latest figures taken from the office of the athletic director showed the football players having an average higher than that of the entire student body is proof of their quality.

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Franklin P. Lannon, Jr.

John M. Spitler

John M. Spitler

Mines 1940 Class a Record Breaker

Dean Jesse R. Morgan, of the Colorado School of Mines, has recommended to the faculty the enrollment of about a hundred forty-four men, the largest senior class in the history of the school, to receive degrees in engineering in the minerals industry this year. Included in this class are fourteen from Denver and seventy-five from Colorado.

The degree Engineer of Mines will be granted to forty-four; the degree Metallurgical Engineer to thirty-three; Geological Engineer to thirty-nine; and Petroleum Engineer to twenty-eight. In addition, a number of students whose many years of experience in mining and whose many years of service elsewhere, during the peak of the depression will be granted advanced degrees and diplomas: three doctor of engineering in geophysics; two masters of mining engineering; and two masters of metallurgical engineering.

"This year's senior class is not only the largest in the history of the Colorado School of Mines, but it also exceeds last year's, the largest previous, by nearly fifteen percent," said Dean Morgan, who has seen sixteen senior classes graduate at the School of Mines.

In 1924 when Dean Morgan witnessed the first commencement at the School of Mines, after his joining the faculty, sixty-nine were granted degrees. The number has grown steadily and the present senior class is nearly double that number.

"Indications now are that this year's graduates will be as successful as last year's in securing employment," Dean Morgan declared. Last year the Colorado School of Mines was the only college or university in America that scored a hundred percent in a survey conducted by a New York newspaper to determine the percentage of graduates obtaining positions in the fields for which they had prepared themselves.

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TEN WILFLEY 5" MODEL "CB" SAND PUMP
of the North Texas area for the Shell Oil Company. His mailing address is 2902 Portland Ave., H. E. R. Willey, '14, is President of A. R. Willett & Sons, Inc. of Denver manufacturer of the Willey Pump. James C. Willey, '21, has moved from Houston, Texas, to Alabama, California, where he is Sales Engineer for the Willey Pump Company. He has held several positions with large companies in the oil industry.

Wm. D. Wallman, '99
French-Wyoming Oil Company
615 Edison Blvd., Los Angeles, Calif.

Elmer R. Willey, '14
Western Centrifugal Pump Company
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The following oil companies are represented in the Southwestern area:

- Shell Oil Company
- Standard Oil Company of New Jersey
- Texas Oil Company

These companies have headquarters in cities such as Houston, Dallas, and Tulsa, and employ many experienced engineers and technicians to manage their operations.


ga. Mention of oil companies and their locations.

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Weimar Sanitarium, Weimar, California, and the Los Angeles Hospital, Los Angeles, California, are mentioned as institutions. Additionally, a reference to a gift exhibition for Mines Men.

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Hyder-Gibbs
Mr. and Mrs. B. W. Samz, '39, welcomed a young son into their home on March 17, 1940, whom they have named Fred. The family resides at 836 Tenth Ave. S., Seattle, Washington, I. C.

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An advertisement for the Mines Magazine, offering prizes for a visit to the display room.

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Buyers of Gold and Silver Ore
For Purchase Terms and Shipping Instructions, address
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This book is a valuable resource for anyone interested in the science of pyrolysis and its applications. It is a comprehensive guide to the processes involved in pyrolysis, and it provides a detailed and accurate account of the various steps involved in the production of heavy fuel oil. It is an excellent resource for engineers, chemists, and scientists working in the field of pyrolysis, as well as for anyone interested in the science of petroleum.

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