

NOTICE!

The Alumni Association has for some time been trying to locate the following graduates. If any of the readers of the Magazine know the whereabouts of any of these men please send what information they can to the assistant secretary at Golden:

Carl E. Ambrosius, '88.
Walter J. Atkinson, '96.
Charles F. Breed, '01.
Harry F. Bruce, '01.
Edward J. Bumsted, '01.
Paul H. Carpenter, '10.
Burt Cole, '92.
L. A. Dockery, '95.
William L. Fleming, '03.
E. E. Greve, '05.
F. R. Hamilton, '98.
Leon P. Hill, '08.
George F. Hoyt, '96.
W. H. Jackson, '01.
Gilbert E. Jewel, '93.
B. M. Johnson, '08.
Fred B. Kelley, '99.
A. R. Kenner, '07.
Oscar A. Lampe, '98.
N. W. Logue, '97.
William B. Middleton, '83.
H. E. Nelson, '97.
Enrique A. Schuman, '97.
T. E. Stephenson, '06.
B. T. Wells, '04.
Charles E. Wheeler, '94.

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The
COLORADO SCHOOL OF MINES
MAGAZINE

Vol. I.

GOLDEN, COLO., AUGUST, 1911.

No. 11

Reminiscences of the Hawaiian Islands

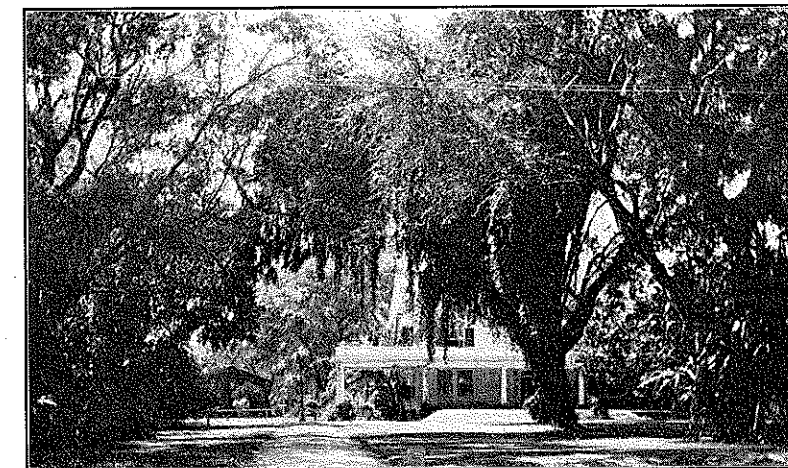
By H. D. Phelps, '10

This short article has nothing to do with mining, and is only intended to be of interest to those of the Alumni who have made their "pile" in the mining business, or as mining engineers, and are now looking for some enjoyable means of spending their time and money. The writer cannot lay claim to such distinction, but no doubt there are some so situated.

At any rate, if chance, fate or fortune ever

That reminds me of the gag the guide gets off to the tourists seeing Golden Gate Park. It goes something like this:

"Ladies and gentlemen, you see on your right a grove of eucalyptus trees. The Southern Pacific owns and cultivates great forests of these trees throughout the Western States. There are many other things owned by the Southern Pacific. In fact, they would own the earth if they could.



GOVERNOR FREAR'S RESIDENCE

favors you with an opportunity to make a visit to the Hawaiian Islands, don't miss it. And let me say here, that if you have any surplus cash left after you get there—besides what you need to return on—there are Americans over there who will help you spend your money, or you can speculate a little on the sugar market, or buy a few thousand acres of pineapples. But to give you a few impressions of Honolulu—about the first thing you see as you steam into the harbor are the big oil tanks, and plant, of the Standard Oil Company. Nearly all of the Pacific steamships use oil-fired boilers.

But, ladies and gentlemen, we have one thing here which they do not own, and that is the great Pacific Ocean. No! they don't own the Pacific Ocean. The Standard Oil Company owns that!"

But to return to Honolulu. I believe the one thing which appeals most to the American tourist is the extreme hospitality of the people. Not only the Hawaiians, but the Americans there, as well.

The Hawaiians are naturally a generous, hospitable, easy-going class of people. They are very fond of music, and small bands of them still walk about the streets in the

evening playing their ukaleles and singing. Quite in keeping with the spirit of ease and tranquility which is so characteristic of the people there, and which so impresses the American—who has still a keen recollection of his few days in Frisco.

The climate is delightful—thanks to the prevailing trade winds, which are always cool and refreshing. The average temperature during the summer months is about 80 degrees; during the winter months about 70 degrees.

There is comparatively little rainfall about Honolulu, as it is situated on the leeward side of the island. The vegetation is luxuriant. I doubt if there is any place where one can find such a variety of tropical plants, trees and palms.

The greatest attraction at Honolulu is the surf bathing. There is nothing like it anywhere in the world. The temperature of the water is close to 78 degrees the year 'round. The surf riding in canoes and on surf boards is a typical Hawaiian sport. The natives, and many of the Americans, are very skillful at it. The novice has much trouble trying to keep his board balanced and at the same time get up sufficient speed, for the rollers or swell to carry him in. He usually emerges out of the rollers wondering what has become of his board; or, if he manages to hold on to it, is trying vainly to get out from underneath.

The expert rides in, standing up, or even standing on his head.

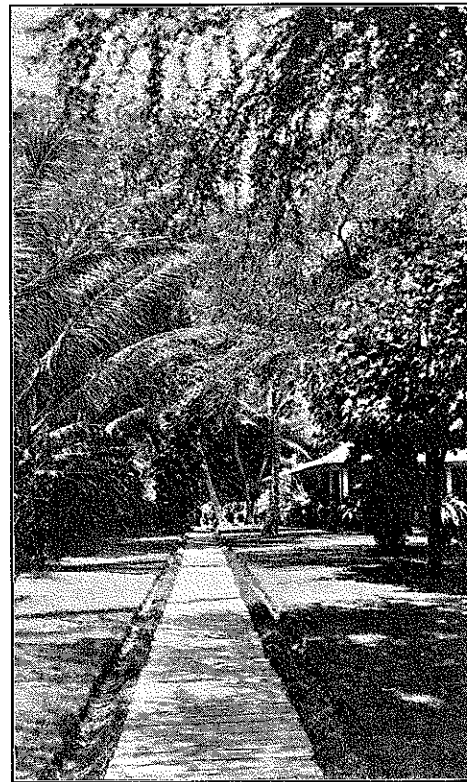
Honolulu is noted for its fine residences. Many of the Americans are very wealthy, having made fortunes in sugar. The wealthy class live in fine style, and, with the army and navy officers, form a very select society. There is a scarcity of what we call the middle class, or plain people. That is, property owners of moderate means, with thrift and energy.

The cheap Japanese laborers and small merchants have overrun the country. Fifty-six per cent. of the population of the Islands are Orientals. They live in congested, dirty tenement houses, are content to make a small profit, and their cost of living is low. The American laborer cannot, or will not, compete with this class. The greater part of the sugar plantation labor is Japanese, but he makes a poor citizen, and is a menace to the development of the land as an American country. The Jap makes his money from the American, but Japan and the sugar trust reap the benefit, while we educate his children.

The Islands are of comparatively recent volcanic origin, but the thin surface of soil is very fertile.

There are 213,000 acres planted in sugar. The yield in 1898 was 521,000 tons, valued at more than \$40,000,000. Over 100,000 acres of this land is irrigated, and most all of the water must be pumped from wells 150 to 300 feet or more in depth. For example: The McBryde Sugar Plantation, which receives power from a hydro-electric plant, operates

six multiple stage centrifugal pumps, each with a direct-connected motor, aggregating 4,000-horse power, a total capacity of thirty-one million gallons per twenty-four hours, or about forty-eight cubic feet per second, at



PRIVATE RESIDENCE

heads varying from 175 to 400 feet, and irrigating over 3,000 acres. This is only one of many quite similar installations on other plantations.

In spite of the cost of pumping water, the large labor required in the field, and the enormous sums spent for fertilizing every year, the sugar companies are making large profits on their investments. The power for the sugar mills is obtained wholly from the burning of bagasse, or cane refuse.

Before leaving the Islands I made a trip to the Volcano of Kilauea (Ke-low-a-a), on the Island of Hawaii.

Kilauea is credited with being the largest active volcano in the world. It has an oval crater three miles long, two miles wide and 600 feet deep, with an area of 2,650 acres (about 4.14 square miles). It is situated on the eastern slope of Mauna Loa, a mountain 13,675 feet high, which itself has been active at irregular intervals.

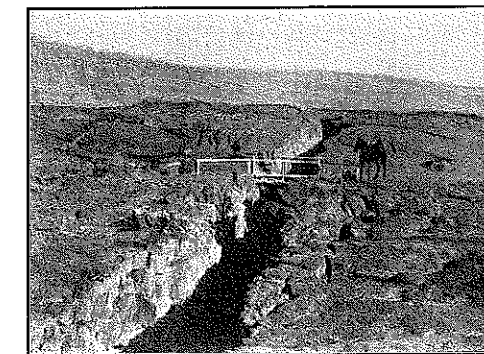
Within the crater, and situated near its center, is a large pit 1,000 feet in diameter. Two hundred and fifty feet below the rim of

this pit is the molten lake of lava known as Halemaumau ("The House of Everlasting Fire"). Often this lake of lava rises to within 50 or 100 feet of the top, or it may sink 800 feet or more and only the volume of sulphur fumes can be seen from the rim of the pit. It has not been known to overflow for a generation.

We arrived at the Volcano House, a hotel situated on the edge of the crater, in the evening. Here we procured a guide, and, on horseback, took the trail down the side of the crater and across the lava plain, to the rim of the pit, a distance of about three miles.

It is truly a wonderful sight as you stand on the edge of this pit and gaze at this fiery, fuming mass of lava.

"Nowhere else may one stand on the brink of a living volcano and gaze into a lake of molten lava, the waves of which, the while, break in fiery billows at the base of the cliff upon which you stand; or witness the unguessed forces of nature working beneath that awful fluid mass, ever and anon forcing upward to a startling height great fire fountains, which rise and fall and pulsate as some living thing. Thousands of persons make long pilgrimages every year to gaze at a smoking mountain in Italy, or in Mexico, a



A CREVASSE IN THE LAVA ALONG THE TRAIL, CROSSING THE CRATER, TO THE FIERY PIT

few of the more rugged making the heart-breaking pilgrimage to the summit to look into a smoke-obscured chasm. In Hawaii other thousands are riding up the mountain slopes in a parlor car to within nine miles of the crater of Kilauea, and completing the journey to the Volcano House in automobiles over a fine macadam road through wonderful fern forests—to pause, awe-stricken, before one of the most stupendous spectacles within the ken of man."

Attention of Roady Kenchan!

An Economist.—An economist is usually a man who can save money by cutting down some other person's expenses.

ASBESTOS DEPOSITS OF CASPER MOUNTAIN, WYOMING.

By H. C. Beeler, '96.

(Continued from Last Month.)

Some Canadian Standards.

In this connection it may be of interest to compare a few notes of the Canadian fiber, which has set the standards of the asbestos world up to the present time.

Mr. Fritz Cirkel in his admirable monograph on "Chrysotile Asbestos, Its Occurrences, Exploitations, Milling, etc.," issued by the Department of Mines of Canada, furnishes the following figures:

"The asbestos of the crude grades is from .25 of one per cent. to .75 of one per cent. of the rock mined. The mill rock is from 50 to 60 per cent. of the rock mined."

"In the Thetford-Black Lake District, the fiber produced forms from 6 to 10 per cent. of the milling rock, and in the Broughton field it is from 7 to 12 per cent. For eight years' production it is stated that the average was 8½ per cent," showing that the high percentage of fiber in the rock is not absolutely essential to the commercial success of the mines, but is not at all objectional.

Mr. Cirkel states that the grade of the asbestos fiber varies in the different Canadian districts and mills, depending, of course, upon their trade demands and customer's requirements, but in general, "number one crude" is given at one inch long, "number two crude" at from one-half to one inch long.

Milling fiber is usually of three grades; the first is spinning fiber, that is to say, fiber less than one-half inch long, which can be spun for special purposes. Number two and three milling grades are used for paper stock, divided by price and trade requirements; the first grade of milling fiber is given at 32 per cent. of the whole and the second and third grades at 68 per cent. of the milling fiber.

Growth of the Canadian Asbestos Industry.

It is of general interest to note the progress of the Canadian fields. Beginning in 1878 with a production of 50 tons, seven years later, in 1885, seven quarries produced 1,400 tons of asbestos and, in 1910, fifteen quarries and 19 mills with capacity of 8,520 tons of rock per day are reported.

The growth of this industry is shown by Mr. Cirkel's report, which shows the value of United States imports of Canadian asbestos and the Canadian exports, showing our growing demand for asbestos and the opportunity for the Wyoming fiber at home; fourteen other countries buy the remainder of the Canadian production, Great Britain leading.

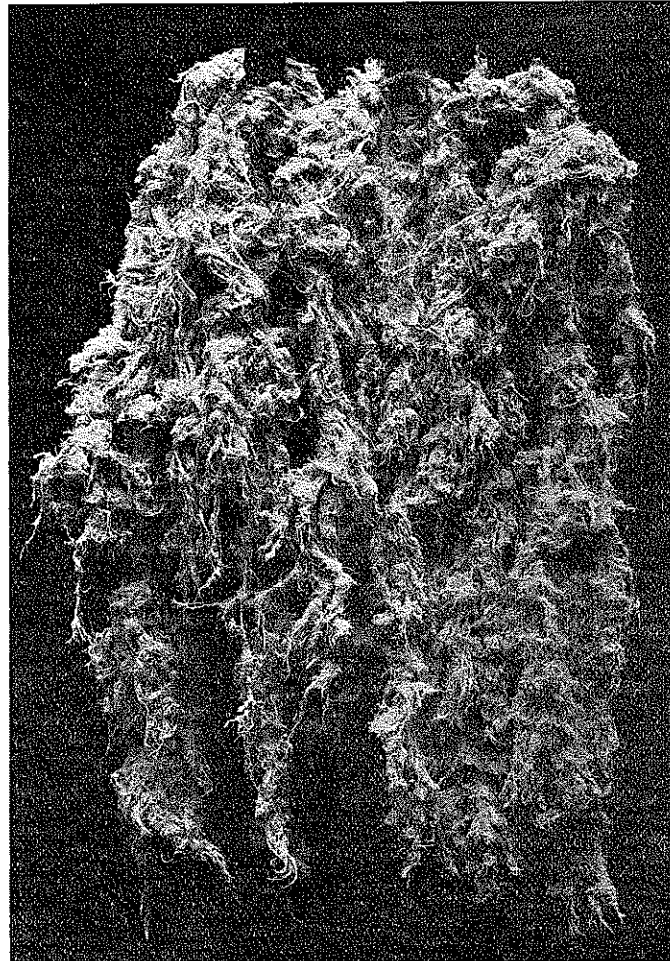
*"The total shipments of asbestos in 1910 with one firm still to hear from, are reported as 75,678 tons, valued at \$2,548,929, as com-

*Prelim. Report Min-Prod. Can., 1910, John McLeish.

pared with 63,349 tons, valued at \$2,284,587 in 1909, an increase of about 19 per cent. in tonnage and 7.6 per cent. in total value.

"The number of men employed in mines and mills is reported as 3,443, at the wage cost of \$1,393,856. While the shipments are reported as above, the actual production was returned as 4,815 tons of crude and 91,353 tons of mill stock produced from 1,474,527

Number one crude, \$275 per ton.
 Number two crude, \$160 per ton.
 Number one milling fiber \$100 to \$110 per ton, the run of mill from \$45 to \$50 per ton.
 Number two milling fiber from \$22 to \$24 per ton.
 Number three milling fiber from \$10 to \$14 per ton.



AN EXAMPLE OF THE MACHINE FIBERIZED CHRYSOTILE, SHOWING ITS STRENGTH AND DUCTILITY

tons of asbestos rock, or a total production of 96,168 tons; stock on hand at the end of the year totaled 39,310 tons, as compared with 20,921 tons on hand at December 31, 1909."

These figures show that the crude was less than 3 per cent. and the mill stock slightly better than 6 per cent. of the total rock mined.

Trade Prices.

The official figures of the Canadian industry of the value of the different "standard" grades of fiber products are as follows:

These are the figures from the official publication of the industry, but it is a matter of experience that these must be taken as the average prices rather than an actual trade quotation.

Number one Canadian milling fiber sold in Denver cost \$400 per ton, with proportionate increase in the cheaper grades, in addition to \$35 per ton freight charges.

The Wyoming fiber sold in the open market in Denver met these prices, and so far the Wyoming producers have no cause to quarrel with their Canadian brothers about

the question of prices, quality and length of fiber being equal.

Cost of Production.

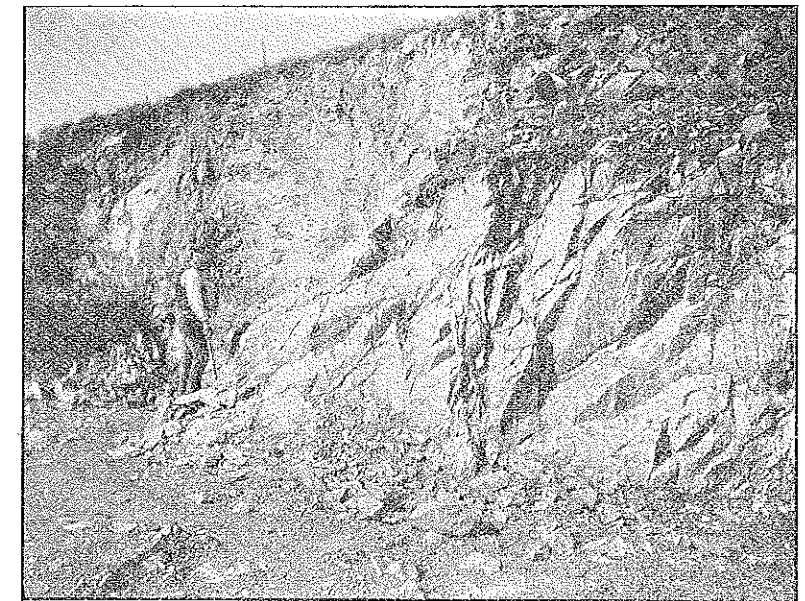
For these figures we are again referred to the Canadian trade as the American trade has not advanced far enough to permit the comparative averages being made public. These Canadian figures are the result of years of compilation and in some instances represent an average of ten or twelve years' experience.

In the Broughton district where only milling grades are produced, the average cost is given as from \$12 to \$14 per ton of asbestos, based on an 8 per cent. rock.

In the Thetford and Black Lake District, where both crude and milling fiber are produced, the cost is given from \$20 to \$27 per

this showing. A fiberizing mill has just been completed, capacity 250 tons per 24 hours and the first runs indicate a high degree of efficiency, but it is now too early to give accurate figures as to its work. The scheme of treatment is similar to that of the Smith Creek Mill.

On the Wyoming Consolidated property, now leased by the International Asbestos Mills & Power Company, a fiberizing mill was completed last fall and is in successful operation. This mill has a capacity of about 150 tons of rock per 24 hours and was the first asbestos mill erected on the Wyoming deposit. The work of the first season was largely experimental, but some remarkable results were attained in the treatment and separation of the fiber.



VIEW OF UPPER PORTION OF QUARRY AT UPPER SMITH CREEK DEPOSIT

ton, the increase in cost being due to the careful handling and sorting required for the higher grades of the crude fiber.

These Canadian figures are included for the purpose of giving a comparative idea of what may be reasonably expected from the Wyoming fields within the next few years.

Local Development.

The Wyoming development has been comparatively limited, there being but three of the known areas opened up or made producing. In the Casper Mountain deposits being worked by the Northwestern Asbestos Mills Company, a shaft has been sunk on the deposit and shows a solid fiber zone of 20 feet in actual developed width, other workings showing additional width. The serpentine belt here is about a mile wide and the fiber zones have been traced from 100 feet up to several hundred feet wide on

The process at this mill consists of crushing in a jaw crusher, the crushed material passes into a Jeffery Rotary stone crusher, where the first rough fiberization takes place. From this crusher it passes to an elevator and is thrown on to a Jeffray shaking screen, this screen in common with all the screens in this process, making three products, viz: fines, fiber and oversize, the fines passing through the screen and the first roughly fiberized material being taken up by suction from a fan, whence it is sent to the shipping bins. The oversize from this screen passes to a machine known as "Jumbo fiberizer," especially designed for this work by Mr. C. H. Parker, of Thetford Mines, Canada.

This machine consists simply of a cylinder in which a number of arms revolve at a high speed and simply beat out the fiber material,

which then passes to an elevator and is dropped on a Colorado Iron Works' Impact Screen, the fines from this screen and from the first screen meet in a common shoot and go to the sand and waste-box, the fiber being taken up by a fan and sent to the shipping bins.

The operation of this first mill, as might have been expected, developed some interesting conditions somewhat different from those encountered in the treatment of the Canadian fiber, and it has been necessary to make a number of minor changes, particularly in the handling of the fiber on the screens and in the operation of the fiberizers. This experiment shows that the best results are obtained, not by beating the rock and fiber as in Canada, but by putting the partially fiberized fiber through a tearing process, somewhat similar to the cards used in cotton mills.

As may be noted by experiments with the hand cards, the fiber is readily separable by a twisting or tearing motion, where a hammering or beating motion simply beats it into "sticks" as they are known in the trade, and which are required to be re-fiberized or carded as the requirements of the trade may direct. A number of changes looking to secure this effect are now in course of consideration, and it is possible that these results may form the subject of a future paper should they prove of interest.

Experiments on Waste Material.

During the winter just passed, the writer conducted a series of experiments at the Testing Plant of the Colorado Iron Works at Denver, running only waste rock or very low grade short fiber about of the grade exhibited, a small fan and a collection chamber being added to the standard equipment of the plant.

Three grades of material were produced on a commercial scale and found ready sale. The material was crushed through a jaw crusher, put through two sets of ordinary high speed rolls, then screened on an impact screen, the fiber being taken up by a small fan. The first class was the fiber, which was of the shortest variety, but nearly perfectly fiberized in its passage through the rolls. The second class or sand was the under size of a twenty-mesh screen and the over size of a thirty-mesh screen and which contained a goodly percentage of very short fiber also more or less fiberized, and the third or under size from the thirty-mesh screen contained the dust, both of serpentine rock and minute fiber.

The purpose of these experiments was to determine whether products could be made, using the very short fiber and its enclosing and waste serpentine rock and whether these products would be of commercial value in making fire and sound-proof fillings, floor deadenings, cement, and etc. These materials were sold, mixed in various proportions and used with great success in buildings all over the City of Denver and instanced a

distinctly new opportunity in the West for asbestos waste products.

These materials or similar grades from the Canadian fields are also used by the great asbestos manufacturing firms in the East, with whom all are familiar, in the manufacture of asbestos cements, shingles, plaster and etc.; it will be but a short time, however, before the Wyoming products appear on the market in similar form.

Asbestos Supply in United States.

It may be of interest to those who, being interested in other lines, have not given the subject much attention, to note that there are but three known localities in the United States where chrysotile asbestos appears in quantity, the Idaho and Georgia deposits being amphibole; the first in Vermont in a comparatively limited deposit, now in operation, the second in a deposit situated at the bottom of the Grand Canyon of Colorado, in Arizona, where the natural difficulties of production and delivery make it scarcely of commercial importance at this time, and third, the Wyoming deposits of the Casper Mountain region.

These latter deposits present no particular difficulties either in production or delivery, the topography of the country being favorable to the construction of branch lines from the railroads already close by, seventeen miles being the greatest distance to be overcome, and this being now covered by a first class wagon road.

Tonnage Available.

The question is frequently asked as to the available tonnage in these deposits and the writer frankly admits his inability to answer the question, but consider if you will, three proven deposits varying from a mile to at least a mile and a half in length, showing fiber zones from 100 feet up to several hundred feet in width and exposed by the natural canyon conditions to a depth of 400 to 800 feet, now apply to these the most conservative figures available for the fiber contents of the exploited deposits and the resulting tonnage will startle even those who are accustomed to large tonnage figures. Inexhaustible seems to be the real word to apply to these deposits and the quality of the fiber produced is an acknowledged fact.

A remarkable instance of the quality of this Wyoming chrysotile was furnished by some of the fiber taken from an old abandoned prospect hole, the dump overgrown with sage brush and apparently many years old. This fiber had lain exposed to the weather through many seasons, was matted and caked with mud and slime, but on being roughly cleansed and worked up, was spun into a stout thread, the spinning quality being apparently unimpaired by the weathering received.

This new industry has been most cordially received and supported by the public and a ready market has been found for all the material produced. A number of manu-

NEW ATHLETIC DIRECTOR.

"Bill" Johnson in Charge of Mines Athletics.

Announcement has just been made of the appointment of William E. Johnson, one of Colorado's best known athletes, and a former School of Mines man, to the position of general athletic director at the School of Mines. He takes the place of Capt. Will C. Bryan, and in addition to having charge of all athletics, will be the coach and trainer of the basket ball, baseball and track teams.

Bill Johnson has been known in Colorado athletics since he entered East Denver High School. During his four-year career there he made his first appearance as a track man and a football player. He played on the football team for three years and then began his successful career as a half-back. He was left-fielder on the baseball team for one year.

After he was graduated from high school in 1901, he entered the School of Mines. He was here one year, and his ability as a runner and half-back was given its first test. One year after this he spent at California, but was not active in athletics on the coast on account of the one-year rule. In the fall of 1903 he entered the University of Colorado, where he was known as one of the fastest 100 and 220-yard men, and a plunging and vivacious half-back. It was during his career at Colorado that he made records in the 100 and 220-yard dashes, the high jump and the broad jump. He is regarded as one of the fastest half-backs Colorado has ever known.

Since he left Boulder he has been in the East and South. He was coach at the University of Kentucky for four years, and met with success. For the last two years he has been coach of the athletics, football and baseball teams of Wooster, Ohio. Last Spring his team played fifteen games and lost only one. The team was the champion of the State. It was a member of the Big Nine of Ohio, a conference to which many teams in Ohio belong. When he left Wooster he was presented with a magnificent loving cup by the students of the university as a token of their appreciation of his services.

The Home-Coming.

(Success Magazine.)

They say that John Nicholas Beffel, the poet, went away from home at a tender age and for a while wrote home glowing letters about his prospects. The letters finally ceased. One cold evening, when the snow was piling up in the main street of Seneca, Ill., the elder Beffel sat down to supper and looked dolefully at the vacant chair. But beneath his plate he found this note:

"Dear Dad: Please meet me at the old stone bridge at midnight and bring a blanket or a suit of clothes. I have a hat. JOHN."

facturers of asbestos goods have come out strongly in favor of the Wyoming fiber in preference to the Canadian, as being best suited for their purposes and possessing certain qualities which meet their requirements.

In this connection it may be noted that the Wyoming crude is particularly free from magnetic iron, the writer never having encountered this mineral in his investigation of the Wyoming deposits, whereas magnetite and some of the allied minerals are common in a number of the Canadian deposits and causes more or less complications of their treatment processes, requiring electric or magnetic separators to remove these impurities.

It is too much to expect, of course, that that Wyoming fields will always prove entirely free from these impurities, as a deposit of chromite and magnetic irons have been noted on Deer Creek, east of the deposits, but so far this condition is absent from the properties now in operation.

Increased Uses.

A catalog of the uses of asbestos is out of place here, but even the technical world scarcely realizes the almost universal use of this mineral and how it is growing into an indispensable place every where.

Asbestos plays a more important part in the national life than is generally credited to it. The well made asbestos theater curtain assures the safety of the audience from stage fires. In the home the asbestos covering of the furnace and heating pipes or of the gas logs in the open fireplace, makes for economy and comfort. Wherever steam is used as a motive power in factories, on trains, or on ships, it is asbestos packing that holds the steam to its work; on the other hand, if electricity is employed the wires are probably insulated by asbestos tape and the adjacent parts are made of asbestos "lumber." Asbestos shingles and sheathing make houses cooler in summer and warmer in winter, and reduce the fire risk. From the ice house, where asbestos protects the brine pipes from the heated air, to the foundry, where it shields the workman from molten metal, in the workshop, the home, or the place of amusement, asbestos contributes materially to human welfare. (U. S. Geol. Sur., 456.)

The commercial success of these Wyoming deposits must depend entirely upon the qualities of the fiber, but in view of the accurate investigations made before commercial productions were attempted, its present successful use and the opinion of those who have grown gray in the exploitation and building up of the Canadian and European asbestos industries, it appears to be entirely reasonable to predict that the Wyoming asbestos industry will grow like its Canadian brother and become a potent factor in the economic mineral history of the West.

"And was he cool in the hour of danger?"
"Well, his feet were."

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Colorado School of Mines
Magazine

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WALTER C. HUNTINGTON 1912
ADOLPH BREGMAN 1913
TSUNG TE KAO 1914
SPORTING EDITOR.
HAROLD C. PRICE 1913

VOL. 1. AUGUST, 1911. No. 11.

Because of the length of the list of Alumni with their addresses, printed elsewhere in this number, considerable material has been crowded out of this number.

The standing in the Alumni Association is shown in parentheses after the names of the graduates, lack of standing by absence of parentheses. We want everyone to make a special effort this next month or so to persuade one or more of the graduates, not already in the Association, to join and subscribe for the magazine. As a rule, graduates who are not members are also non-subscribers. And, we are sorry to say, some of the older life members appear to have lost all interest and have not had the courtesy to even answer our letters and requests to subscribe.

Won't you please help the Association out this way: Look through the list carefully, send us all the missing addresses you can, send in your own permanent address, if missing or incorrect, make a list of your acquaintances who are not members and write to each of them urging them to join and subscribe and boost. And do not forget to remind our advertisers that you see their advertisements in the magazine. Some are doing this we know, and it is helping us a great deal. If it was not for the advertisers

the magazine could not be running now. Note the new professors and then look up our editorial heading in the June number.

Y. M. C. A. NOTES.

The new Y. M. C. A. hand-book is just out and is better than ever. See that you get a copy. They are very useful memorandum books and give the best school songs and yells, and much information about the social side of the school.

J. B. Watson, the genial secretary, left for a visit to the home folks the last of June. He will return to Golden the last of August, with a handsome young bride clinging to his arm. (This last sentence will call forth a gentle sigh from most of the unattached young ladies of Golden.)

ABSTRACTS.

I am with the Pacific Light and Power Company, as resident engineer, on the Big Creek power project. They expect to develop about 300,000 horse-power here by a series of tunnels and power-houses down the canon. They have a 1,400-acre reservoir, and about 5,000-foot head with about 90 second-feet of water.

Yours very truly,
H. C. ARMINGTON,
Shaver, Fresno Co., Calif.
Care Big Creek Camp.

As soon as I get settled so that I know where I will be for at least a couple of months, I will remit some more, for you certainly have the proper spirit and deserve the support of everybody. Success to you and your works. Very truly yours,

J. J. CORY,
1642 Detroit St., Denver, Colo.

I have not received the photos yet, though they are doubtless in Mitchell. During the last three weeks I have been in Mitchell but very little, and have been kept on the go from one end of the project to the other. I am now again on the way to Pathfinder, and may not be back in Mitchell for a week.

I was pleased to note my election as Vice-President with but one dissenting vote, which I cast myself. I will always be glad to help the Association whenever I can, and appreciate that it has taken a new lease on life. If every Alumnus contributes a little we can make it a live organization, capable of doing much to advance the interests of the school.

I read your account of the banquet with a great deal of interest, and was glad to note that our paper and its editor received the recognition they deserve.

Well, I must close. Kindest regards and best wishes for your future success.

As ever yours,
ANDREW WEISS.

I wish to express my hearty appreciation of the Magazine and the good work it is doing. I look forward to each number with the keenest anticipation. Yours sincerely,

S. H. SHERMAN, '04.
Christmas, Ariz.

PERSONALS.

'92.
N. H. Brown has been selected by Henry P. Lowe to take general charge of the Frontenac, Adduddel and Topeka group of mines, and also the Penn and Iron City Mills. Mr. Brown has secured Walter A. Funk, '03, to assist him in his mineral surveying and office work at Idaho Springs.

'93.
P. M. Collins is now with the Butte and Superior Copper Co., supervising a series of tests on their ore in the Basin Mill.

'95.
Charles T. Durell sent us a card, dated June 23, stating he expected to leave the Headwaters Mining Company, Bagiuo, P. I., soon, and would send permanent address later. Letters addressed to Manila will be forwarded.

'97.
To the person interested in the milling of low and medium grade ores the Hudson Mill, owned by New York capitalists, and managed by Arthur H. Roller, a School of Mines graduate, is an item of prime importance, because the method followed is a new departure in milling, and one that gives the small miner no cause for suspicion or complaint. The ores are purchased outright on the fire assay basis, going as low in value as \$2.75 to the ton. Last week the mill was closed for the purpose of installing cyanide fixtures, it being the purpose of the management to use cyanide in all departments, from the stamps for crushing the ores to the final treatment of the tailings in the secondary section. The item of energizing the plates and amalgamation tanks with electricity—peculiar to this plant—is retained. The electricity is generated at the mill and costs about 4 cents to the ton of ore, the capacity of the plant ranging from 75 to 100 tons each day, or twice what it was when the mill was started in October last. Under the new arrangement the plant will resume August 1, and expects to save 95 per cent. of the assay values. In the item of preparation the ore is crushed to twenty-four mesh, which is not fine grinding, while the average of the material handled runs \$8 to the ton. As the milling company owns the material, paying the miner upon delivery and test, it is free to make its own mixtures, and to handle those mixtures to the best advantage—a matter out of the reach of the average custom mill, which must handle the ores as they are offered. Under the old practice a saving of 60 per cent. of the values was considered satisfactory. As the cyanide solution is pumped back and used over, the cost

of this feature is small.—Capt. J. T. Smith, Rocky Mountain News.

Edwin E. Bussey left for Valdez, Alaska, where he has accepted a position as assistant superintendent with the Millard Mining Co.

'00.
Lloyd Robey, Superintendent of the Mill of the New York and Honduras Rosario Company, at San Jacinto, Honduras, spent several days in Denver recently. The company is erecting a new mill of 200-ton capacity, tube mills and 1,800-pound stamps.

'01.
A. C. Brinker is with the Exploration Company of England and Mexico, Ltd., and has been moving around a great deal. He was at Santa Eulalia, Chih., Mexico, recently.

'02.
Professor and Mrs. G. M. Butler returned a few days ago from a pleasant visit of several weeks at Lake Geneva, Wis. Professor Butler will leave about the 1st of August to engage in the geological survey field work at Alma, Colo.

'03.
Miss Grace C. U. McDermit was married June 7 to Barry Milligan, the ceremony taking place in Washington, D. C., and being performed by the Rev. J. Henning Nelms. The bridegroom was graduated from the Case School of Applied Science.

Walter A. Funk is located at Idaho Springs, Colo., with N. H. Brown, '92, assisting him in his survey and office work.

'04.
Tenney De Sollar visited the School and Golden about the middle of July for the first time in four years. He enjoyed looking over the gym and the new testing plant, and was feeling must rested by his few weeks' vacation. He has returned to Hancock, Mich.

'05.
J. J. Cory is taking a vacation at Palmer Lake. His permanent address is 1642 Detroit Street, Denver.

Carl A. Allen, our new assistant professor of mining, is having more honors thrust upon him, his home being visited by his majesty, the stork, July 22, who consigned a fine baby boy to his care and keeping.

R. H. Hallett is now smelter superintendent for the Sandoval Zinc Co., at Sandoval.

'06.
James L. Libby was in Golden recently on a visit from Rock Springs, Wyo.

'07.
Mr. and Mrs. Philo Grommon are the proud parents of a splendid baby boy, born to them Saturday, July 22.

Alvin R. Kenner is now with Osgood, Carter & Co., consulting engineers, 403-4 First National Bank Building, Chicago, Ill., as a mining engineer.

'08.
Herman C. Zulch has returned to Seven Troughs, Nev., where he has an office as mining engineer and United States deputy mineral surveyor.

Leon P. Hills is engaged in cyanidation work at Tuolumne, Calif.

L. C. Brown is at Wallstreet, Colo.

Robert M. Wheeler was married to Miss Alice Myers at Colorado Springs, Colo., about the first of July.

'09.

J. A. Weir and C. B. Hull are in Denver.

W. C. J. Rambo and wife are now residing in Denver. Mr. Rambo has his office at 846 Equitable Building.

H. A. Kruger is in Ojuela, Durango, Mexico, as superintendent of the San Juan Mine. He reports that the labor strikes have recently been a source of great annoyance in the district.

C. L. Hansen is at Wallstreet, Colo.

John R. Griffith is now with the Norton Company, Niagara Falls. His address is 122 First Street, Niagara Falls, N. Y.

Ernest B. Wood, assistant manager and treasurer of the Cashier and Zophar Mining and Milling Companies, is now at 1418 Milwaukee Street, Denver, Colo.

C. H. Carpenter has accepted a position as assistant smelter superintendent with the Mazapil Copper Co., Saltillo, Coah., Mexico, and left for Mexico the latter part of July.

'10.

John V. Hubbard is now at 25 Cheyenne Blvd., Colorado Springs, Colo.

J. S. Bradford is at Wallstreet, Colo.

Samuel M. Soupcoff and H. B. Lesh were in Porcupine at the time of the recent terrible forest fire, which caused a great loss of life and property. Mr. Soupcoff managed, by means of a hastily constructed raft, to save himself and eight women. Other Mines men who were in the fire district were Morrison and Robbins. Lesh and Soupcoff were reporting on mining property in South Porcupine, Morrison was engaged by the town of South Porcupine making maps, etc., and Robbins conducted an assay office in the same town.

R. M. Keeney returned from a month's visit with his parents at Sommersville, Conn., and left July 17 for Alaska, expecting to be gone until the later part of August.

K. P. Campbell has been transferred from the Aguascalientes plant of the A. S. & R. Co., to the Matehula smelter; address, Matehula, S. L. P., Mexico, care Cia Met., Mac. III.

Russell J. Farrar is with the M. N. W. Ry., Caballo, via Peasen, Camp C. B. No. 1, Chihuahua, Mexico. R. E. Geary, '09, is also with the M. N. W. Ry., at the same place.

'11.

John V. Harvey is at Ojuelas, Jalisco, Mexico, with a mining company.

M. V. Andre, Jr., is employed as foreman in one of the largest mills in the Guanajuato District, in Mexico, making good in every respect and helping to spread the high reputation of the Colorado School of Mines.

Philip M. McHugh is rapidly making a name for himself as a cyanide expert. He is now doing experimental testing by cyanidation on tailings for the Granite Bimetal-

lic Company of Montana, and has succeeded in getting an extraction of over 80 per cent. silver and 95 per cent. gold. The tailings contain antimony, and the best previous extraction for the silver was 60 per cent, we understand. Some of the best-known cyanide experts in the country have worked on these tailings, but have been unsuccessful. Mr. McHugh is part owner and inventor of a new patented agitator for cyanide solution that is of value and promise.

SCHNEIDER AND ALLEN ELECTED PROFESSORS AT SCHOOL OF MINES.

Both Graduates of the School of Mines.

At a meeting of the Board of Trustees, July 13, George W. Schneider was elected to the position of professor of mining, and Carl A. Allen was elected assistant professor of mining.



GEORGE W. SCHNEIDER,
Professor of Mining, School of Mines.

Professor Schneider graduated in 1894 and has had seventeen years' active experience in mining. After graduation he spent a year at the Atlantic Copper Mine, Michigan, studying mine economics. From 1895 to 1903 he was actively engaged as mining engineer in Gilpin County, where he was also United States mineral surveyor, county engineer, city engineer of Black Hawk and consulting engineer for the Kansas-Burroughs Consolidation and the Concrete Mining Companies.

State Inspector of Mines.

From 1903 to 1907 he was Colorado State inspector of mines. He was then made general manager of the Tommie Mexican Mining Company of Durango, Mexico. Recently he has been consulting engineer for the Conqueror Mining Company, and has done general professional work from headquarters at Denver.

Professor Schneider's specialty has been economics of mining. He is a close student of the details of efficient mine management and will introduce into the School of Mines the ideas of engineering efficiency which are now so successfully being employed in other engineering lines. His wide practical experience, his high standing in the mining profession and his enthusiasm for the work, all indicate that the technical courses in mining at Golden under his guidance will be second to none in the country.



CARL A. ALLEN,
Assistant Professor of Mining.

Started at the Bottom.

Carl Allen graduated in 1905. He began at the bottom after graduation, and worked as mill man and foreman in the mills of Clear Creek and Boulder Counties. Later he was superintendent of the El Tesoro Mining Company of Mexico, coal inspector for the United

States land office, manager of the Vanadium Mining Company of Cutter, N. M., and recently studied mine and mill methods at the Miami Copper Company at Miami, Ariz. He has had a wide experience in nearly every phase of mining. He has a high standing among the younger members of the mining profession. He will bring to the School a knowledge of the latest and best methods of mining.

He is a member of the engineering firm of Allen & Colburn, of Denver.

ALUMNI, COLORADO SCHOOL OF MINES.

Where two addresses are given, the first is the permanent, or home address. If you know of any mistakes or changes in the addresses or occupation given, please notify the Assistant Secretary, Golden, Colorado, and keep him informed of all future changes. We know that some of the permanent addresses, at least, are probably incorrect, as little attention has been paid to permanent addresses in the past. Please see that your addresses are correct on our lists and send us your permanent address, if not given in this list.

Standing in the Alumni Association at date of July 20, 1911, is shown in parentheses after the names.

Abel, Walter D., '06 (1911).

833 16th St., Denver, Colo.

The Guanajuato Reduction and Mines Co., Apartado 55, Guanajuato, Gto, Mexico.

Adami, Charles J., '99 (life).

Assistant General Manager, Doe Run Lead Co., Rivermines, Mo.

Adams, Charles, '04 (1911).

Rhyolite, Nevada.

Adams, Wilber E., '00.

Deceased.

Aldrich, Harold W., '06.

449 Mountain Ave., Boulder, Colo.

Chemist, Washoe Smelter, 618 Main St., Anaconda, Mont.

Allen, Carl A., '05 (1911).

614 Ideal Bldg., Denver, Colo., Allen & Colburn, Mining Engineers.

Assistant Professor of Mining, Colorado School of Mines, Golden, Colo.

Allen, Maynard C., '06 (life).

357 Grant Ave., Denver, Colo.

U. S. Forest Service, Hailey, Idaho.

Aller, Frank D., '92 (life).

Agent A. S. & R. Co., Gatico, Chile, South America.

Ambrosius, Carl E., '88.

Anderson, Axel E., '04 (life).

E. I. Du Pont de Nemours Powder Co., Box 1535, Denver, Colo.

Anderson, Niel A., '02 (1910).

U. S. Deputy Mineral Surveyor, Thornton, Idaho.

Andre, Morris V., '11 (1911).

Apartado 86, Guanajuato, Gto, Mexico.

Arminaton, H. C., '07 (life).

115 West 8th St., Leadville, Colo.

Resident Engineer, Pacific Light & Power Co., Big Creek Camp, Shaver, Calif.

- Arthur, Edward P., '95.
Mining Engineer and U. S. Mineral Surveyor, Box 584, Cripple Creek, Colo.
- Atkins, Horace H., Jr., '94 (1911).
222 North 11th St., Muskogee, Okla.
- Atkinson, W. J., '96.
Atwater, Maxwell W., '01 (1911).
Superintendent, Butte and Superior Mines, Box 1428, Butte, Mont.
- Austin, Arthur, '05 (1910).
Houghton, Mich.
Chemist, International Smelting Co., Tooele, Utah.
- Badger, Herbert E., '02.
920 9th Ave., Greeley, Colo.
- Badgley, Charles W., '06 (life).
1321 East 12th Ave., Denver, Colo.
Engineer and Chemist, Standard Chemical Co., Naturita, Colo. (Uranium and Vanadium Mines).
- Bailey, E. W., '05.
309 McPhee Bldg., Denver, Colo.
- Baker, Hamilton W., '11.
Western M. M. and L. Co., Salida, Colo.
- Ball, Louis R., '00 (1911).
Captain, U. S. Army, Fort Des Moines, Iowa.
- Ball, Max W., '06 (1911).
U. S. Geological Survey, Washington, D. C.
- Ballagh, J. Courtenay, '10 (1911).
1938 5th Ave., Los Angeles, Calif.
Assayer and Chemist, El Tigre M. Co., Yzabel, Sonora, Mexico.
- Barbour, Percy P., '98 (life).
Stevens, Barbour & Co., Mining Engineers, Idaho Springs, Colo.
- Barensheer, William J., '96.
Chief Engineer, G. V. M. & S. L. R. R., 334 Railway Exchange Bldg., Denver.
- Barker, Franklin L., '06.
Hotel Waverly, Minneapolis, Minn.
Professor of Mining, University of Oregon, Eugene, Oregon.
- Barker, Pierce, '07.
10th and Lindley Ave., Logan Sta., Philadelphia, Pa.
New Reduction Works, Anaconda Copper M. Co., 500 Maple St., Anaconda, Mont.
- Barnes, Corrin, '96.
Goldfield, Nevada.
- Barnett, Walter W., '11 (1911).
Box 211, Golden, Colo.
Wellington Mines Co., Breckenridge, Colo.
- Barron, Chauncey T., '02 (1912).
Campania Metalurgica Mexicana, Apartado 132, San Luis Potosi, S. L. P., Mex.
- Bartholomew, Tracy, '06 (life).
1161 Humboldt St., Denver, Colo.
The Western Cement Products Co., 507 Ideal Bldg., Denver, Colo.
- Bastanchury, G. A., '07 (1911).
Fullerton, Calif.
- Beeler, Henry C., '96 (life).
Mining Engineer, International Asbestos Co., 1004 First National Bank Bldg., Denver, Colo.
- Bell, Charles N., '06 (life).
1703 Vine St., Denver, Colo.
Ingersoll, Bell & James, Mining Engineers, Denver, Ouray and Telluride, Colo.
- Bellam, Henry L., '89.
Assayer, Box 686, Reno, Nev.
- Benjovsky, T. D., '09 (life).
Del Norte, Colo.
Leasing Unexpected Mine, Hesperus, Colo.
- Benwell, George A., Jr., '00.
Deceased.
- Bergh, John E., '02.
Superintendent, Dalton & Lark Mine, Lark, Utah.
- Berry, Albert, '05.
Leadville, Colo.
Superintendent, Bridgeport Land Co., Bridgeport, Wash.
- Berthoud, Capt. E. L., Hon. E. M.
Deceased.
- Bertschy, Perry H., '98 (1911).
Greenmct, S. D.
- Bishop, Raymond, '01.
Deceased.
- Blackburn, Ward W., '08.
Golden, Colo.
Representing J. Geo. Leyner Eng. Co., 221 Sherman Ave., New York, N. Y.
- Block, Garry E., '08 (life).
Prescott, Ariz.
630 Postal Telegraph Bldg., Chicago, Ill.
- Blow, A. A. Hon. E. M., '10.
Care White Investing Co., 43 Exchange Place, New York, N. Y.
- Blum, Sidney, '11 (1911).
1922 Grand Ave., Pueblo, Colo.
- Blumenthal, Emil E., '98 (1911).
Granite Bimetallic Co., Phillipsburg, Mont.
- Bowie, James W., '94.
Deceased.
- Bowman, Frank C., '01 (1911).
1814 Marion St., Denver, Colo.
Mining Engineer and Metallurgist, 406-407 Boston Bldg., Denver, Colo.
- Bowman, Reginald G., '11.
309 C St., N. W., Washington, D. C.
Engineering Dept., B. A. & P. R. R., 310 West 3rd St., Anaconda, Mont.
- Boyd, Jesse T., '08 (life).
1115 Race St., Denver, Colo.
Resident Engineer, Camp Bird Mines, Ouray, Colo.
- Bradford, Albert H., '09 (life).
Placencia, Orange Co., Calif.
Manager, Joyoha Mines and Mill, Apartado 19, Magdalena, Sonora, Mexico.
- Bradford, Julius S., '10 (1910).
1646 Arapahoe St., Denver, Colo.
Superintendent, Investors' M. & L. Co., Wallstreet, Colo.
- Bradley, Joseph M., '01 (life).
Florence, Colo.
- Brandt, A. R., '07.
820 Elati St., Denver, Colo.
- Breed, Charles F., '01.
Brinker, Arthur C., '01 (life).
10 Chamber of Commerce, El Paso, Texas.
- Brinker, Albert W., '08.
Deceased.
- Brooks, Eugene C., '10 (1912).
38 Lincoln St., Boston, Mass.
Leasing Unexpected Mine, Hesperus, Colo.
- Brown, Leroy C., '08 (1911).
Wallstreet, Colo.

- Brown, John B., '06.
Brown & Ames, Apartado 128, Pachuca, Mexico.
- Brown, Norton H., '92 (1911).
U. S. Mineral Surveyor and Mining Engineer, Idaho Springs, Colo.
- Brown, R. L., '05.
2051 Downing St., Denver, Colo.
Professor of Mining and Geology, Alabama Polytechnic Institute, Box "O," Auburn, Ala.
- Brown, Samuel R., Jr., '11.
Box 246, Montrose, Colo.
Mill, Tomboy Gold Mines Co., Ltd., Smuggler, Colo.
- Brown, Walter R., '10 (1910).
S. A. E. House, Golden, Colo.
Nevada Consolidated Copper Co., Ruth, Nevada.
- Bruce, Harry F., '00.
Bruce, James L., '01 (1911).
General Manager, Continental Zinc Co., 106 N. Wall St., Joplin, Mo.
- Bruce, Stewart S., '99.
Professor of Metallurgy, Michigan College of Mines, Houghton, Mich.
- Bruderslin, Emil J., '10 (1912).
1276 Emerson St., Denver, Colo.
Ohio & Colorado Smelting Co., Box 346, Salida, Colo.
- Brunel, Rene L., '06.
Golden, Colo.
Millers, Nev.
- Bryan, Russell R., '08 (1911).
2256 Williams St., Denver, Colo.
Engineer and Assayer, Sonora Exploration Co., Box 16, Nacozari, Sonora, Mex.
- Bucher, John W., '02.
4267 Boulevard F, Denver, Colo.
Chief Engineer, Colorado Iron Works, 33rd and Wynkoop St., Denver, Colo.
- Buck, Arthur H., '97 (1911).
2822 Arapahoe St., Denver, Colo.
Revenue Tunnel Mines Co., Sneffels, Colo.
- Budrow, William B., '92 (1911).
Mining Engineer, Calle Hidalgo 1147, Guadalajara, Jalisco, Mexico.
- Buell, Arthur W., '08 (life).
Evergreen, Jefferson Co., Colo.
South American Development Co., The Newberry Club, Box 366, Guayaquil, Ecuador, South America.
- Bulkley, Frank, Hon. E. M. (1911).
Mining Engineer, 850 Equitable Bldg., Denver, Colo.
- Bumsted, Edward J., '01.
3640 South Hope St., Los Angeles, Calif.
- Bunger, Milne E., '09 (1911).
Surveyor, Box 262, Edgewater, Colo.
- Burgess, Charles W., '09 (1911).
142 W. Cedar St., Denver, Colo.
General Superintendent, S. V. & D. Lead and Zinc Co., Box 287, Carthage, Mo.
- Burlingame, Walter E., '01 (life).
E. E. Burlingame & Co., Chemists and Assayers, Box 1520, 1736 Lawrence St., Denver, Colo.
- Busey, A. P., Jr., '05 (life).
Care Dr. A. P. Busey, State Asylum, Pueblo, Colo.
- Manager Penn Mining Co., Campo Seco, Calaveras Co., Calif.
- Bussey, Edwin E., '97 (1911).
Cripple Creek, Colo.
Assistant Superintendent, Millard M. Co., Valdez, Alaska.
- Butler, G. Montague, '02 (1911).
Associate Professor of Geology and Mineralogy, Colorado School of Mines, Golden, Colo.
- Campbell, Kent P., '10 (1911).
522 Pine St., Boulder, Colo.
A. S. & R. Co., Apartado 137, Aguascalientes, Aguas, Mexico.
- Canning, Herbert A., '97.
Aspen, Colo.
Manager, Pioneer Consolidated M. Co., Pioneer, Nev.
- Canning, Walter E., '09.
412 Oakland Ave., Council Bluffs, Iowa.
- Carman, John B., '10 (1911).
1154 Corona St., Denver, Colo.
A. S. & R. Co., Velardena, Durango, Mexico.
- Carney, Hugh J., '04 (life).
Mining Engineer, Ouray, Colo.
- Carpenter, Cranston H., '09 (1911).
508 Equitable Bldg., Denver, Colo.
Assistant Smelter Superintendent, Mazapil Copper Co., Saltillo, Coah, Mexico.
- Carpenter, Paul H. (1910).
Carstarphen, F. C., '05 (1911).
1240 Vine St., Denver, Colo.
Mining and Consulting Engineer, 517 Ideal Bldg., Denver, Colo.
- Cary, Webster P., '10 (1912).
1015 Corona St., Denver, Colo.
Ohio and Colorado Smelting Co., Box 346, Salida, Colo.
- Chamberlin, W. O., '05 (life).
Mining Engineer, 200 Pearl St., Denver, Colo.
- Chandler, John W., '01 (life).
2815 Channing Way, Berkeley, Calif.
Centerville, Alameda Co., Calif.
- Chapman, Thomas L., '06 (1911).
Aspen, Colo.
Chemist, Stratton Independence Mill, Box 235, Goldfield, Colo.
- Charles, Lavern J., '02 (1910).
U. S. Reclamation Service, Engle Dam, Elephant Butte, New Mexico.
- Chedsey, William R., '08 (life).
Mining Engineer, 1414 Gaylord St., Denver, Colo.
- Christensen, Walter, '02.
306 East 5th St., Fremont, Neb.
- Church, Myron J., '98 (1911).
Davis Manufacturing Co., Park St. and 15th Ave., Milwaukee, Wis.
- Clapp, Leroy P., '09.
South Yarra, Melbourne, Australia.
- Clark, Geo. B., '01 (life).
1614 Lake Ave., Pueblo, Colo.
Assayer and Chemist, Box 466, Pueblo, Colo.
- Clark, Winfred N., '98 (1911).
Superintendent, Pueblo and Suburban T. & L. Co., Victor, Colo.

- Clausen, Samuel J., Jr., '11.**
Clear Lake, Iowa.
- Cline, Seymour F., '08.**
116 Vennum Ave., Mansfield, Ohio.
- Coghill, Will H., '03 (1911).**
Instructor of Mining and Metallurgy,
Northwestern University, 813 Goffield
Place, Evanston, Ill.
- Cohen, Louis, '97 (life).**
Mining and Metallurgical Engineer, 410
Chamber of Commerce, Denver, Colo.
- Colburn, C. L., '07 (1911).**
965 Ogden St., Denver, Colo.
Allen & Colburn, Mining Engineers, 614
Ideal Bldg., Denver, Colo.
- Cole, Burt, '92.**
- Coleman, R. Prewitt, '03.**
Deceased.
- Collbran, Arthur H., '02 (life).**
Manager, Suan Mine.
Pyeng Yang, Korea.
- Collins, Phillip M., '93 (1911).**
Chemist, American Zinc Extraction Co.,
214 West 7th St., Leadville, Colo.
- Collins, Shrive B., '01.**
Mining Engineer, Amethyst P. O., Creede,
Colo.
- Comstock, Charles W., '90.**
State Engineer, State Capitol, Denver,
Colo. 213 Boston Bldg., Denver, Colo.
- Corry, Arthur V., '98.**
Mining Engineer, Box 323, Butte, Mont.
- Corson, N. G., '07 (1910).**
Del Norte, Colo.
Mining Engineer, Creede, Colo.
- Cory, J. J., '05 (1911).**
1642 Detroit St., Denver, Colo.
- Cox, Augustus D., '03.**
Mechanical Engineer, Belmont Mining Co.,
Box 951, Tonopah, Nev.
- Cox, W. Ray, '02 (life).**
Mineral Examiner, U. S. Land Office, Box
865, Helena, Mont.
- Craigue, William H., '89.**
Rhyolite, Nevada.
- Cramer, Curtis P., '99 (1910).**
Superintendent, Emma Mine, Copper
Queen Cons. M. Co., Fierro, New Mexico.
- Crow, Wade L., '01.**
Deceased.
- Crowe, Thomas B., '00 (life).**
Superintendent, New Portland Mill, Vic-
tor, Colo.
- Cuno, A. F., '05.**
125 Detroit St., Denver, Colo.
Manager, Cuno Engineering and Construc-
tion Co., 1727 Champa St., Denver, Colo.
- Curtis, Roy P., '09 (1911).**
548 Equitable Bldg., Denver, Colo.
Superintendent, Mosida Fruit Lands Co.,
Box 274, Provo, Utah.
- D'Arcy, R. L., '05.**
Grand Valley, Colo.
- Davey, William R., '98 (1911).**
U. S. General Land Office, 306 Custom
House, Portland, Ore.
- Davis, Carl R., '95.**
General Manager, Lancaster Gold Mining
Co., Ltd., Krugersdorp, Transvaal, South
Africa.
- Davis, Gilbert L., '99 (life).**
U. S. Reclamation Service, Ridgellawn,
Mont.
- De Camp, W. Val., '08.**
2934 Wyandotte St., Denver, Colo.
General Manager, Pacific Copper Mining
Co., Crown King, Yavapai Co., Ariz.
- De Cou, Ralph E., '01.**
Camp Bird Mill, Ouray, Colo.
- De Sollar, Tenney C., '04 (1911).**
Mining Engineer, Quincy Mining Co.,
Box 45, Hancock, Mich.
- Divinney, George V., '03.**
Deceased.
- Dilts, Ira J., '08 (life).**
514 Remington St., Fort Collins, Colo.
Chemist, U. S. Portland Cement Co., Con-
crete, Colo.
- Dittus, Edward J., '11.**
1438 Franklin St., Denver, Colo.
- Dockery, L. A., '95 (1911).**
Mineral de Dolores, Madera, Chih., Mexico.
- Dollison, James E., '98 (life).**
Surveyor and Proprietor, Alma Assay Of-
fice, Alma, Colo.
- Douglas, William C., '11.**
676 West 8th St., Plainsfield, N. J.
- Dow, William G., '06 (life).**
151 Archer Place, Denver, Colo.
Chief Engineer, Eden Irrigation and Land
Co., Eden, Wyo.
- Downer, Roger H., '01 (1911).**
Downer Bros., Assayers and Chemists,
Box 175, Goldfield, Nevada.
- Doyle, Donald B., '09.**
201 N. Craig St., Pittsburg, Pa.
Chino Copper Co., Santa Rita, N. M.
- Draper, Marshall D., '97 (life).**
127 East 7th Ave., Denver, Colo.
Draper & Gross, Mining Engineers, 745
Equitable Bldg., Denver, Colo.
- Drescher, Frank M., '00 (life).**
1358 Williams St., Denver, Colo.
Drescher & Wolfersberger, 330 Mack Blk.,
Denver, Colo.
- Duer, C. L., '05 (1910).**
1427 East 29th Ave., Denver, Colo.
Mineral Land Inspector, 712 E. & C. Bldg.,
Denver, Colo.
- Dunkle, Fred W., '03.**
Examining Engineer, 1103 Center St., Wil-
kingsburg Sta., Pittsburg, Pa.
- Dunlevy, Forrest S., '08.**
1821 East 31st Ave., Denver, Colo.
Division Engineer, Victor American Fuel
Co., Box 173, Hastings, Colo.
- Durell, Charles T., '95 (life).**
Manager, Headwaters M. Co., Bagiuo,
Benguet, Philippine Islands.
- Dwelle, Jesse E., '96 (life).**
2244 Gaylord St., Denver, Colo.
Empire Zinc Co., 703 Symes Bldg., Den-
ver, Colo.
- Dyer, Charles E., '10 (1911).**
Daly West Co., Park City, Utah.
- Eames, L. B., '05 (1910).**
3009 High St., Pueblo, Colo.
- East, John H., Jr., '10 (1910).**
1510 Glenarm St., Denver, Colo.
Winona Gold-Copper Mining Co., Painter,
Wyo.

- Eaton, Albert L., '95 (1911).**
General Superintendent, Chihuahua M. Co.,
Box 13, Chihuahua, Chih., Mexico.
- Eddy, Harold C., '09 (1911).**
Superintendent, Orleans Petroleum Co.,
Geologist, Cambria Oil Co., Cambria,
Calif.
- Ehle, Mark, Jr., '01 (life).**
11 East Kansas City St., Rapid City, S. D.
Professor of Mining, South Dakota School
of Mines, Rapid City, S. D.
- Ehrich, Walter L., '02 (1911).**
463 5th Ave., New York, N. Y.
- Elder, Robert B., '08 (1911).**
Kappa Sigma House, Golden, Colo.
U. S. Coast and Geodetic Survey, 412 Fed-
eral Bldg., Seattle, Wash.
- Ellis, T. P., '07 (1911).**
1807 A St., San Diego, Calif.
- Ellis, William W., '02.**
Ellis & Marshall, 527 17th St., Denver,
Colo.
- Ellsworth, Alfred C., '08 (1911).**
7614 Union Ave., Chicago, Ill.
Ellsworth-Klanor Construction Co., 412-
413 Central Block, Pueblo, Colo.
- Emeis, Walter A., '04.**
Mining and Mechanical Engineer, Twin
Falls, Idaho.
- Emens, Ray B., '07.**
Victor, Colo.
Walter M. Brown Engineering Co., Search-
light, Nevada.
- Emrich, Clarence T., '09.**
North American Smelting and Mining Co.,
Box 533, Golden, Colo.
- Emrich, Horace H., '03 (life).**
Manager, Copper Refinery, Kyshtim Min-
ing Works, Perm. Government, Kyshtim,
Russia.
- Engle, Frederick, '11 (1911).**
1756 Gilpin St., Denver, Colo.
Ingersoll, Bell & James, Box 1117, Ouray,
Colo.
- Enriquez, Edward W., '09 (life).**
Independencia 277, Chihuahua, Chih., Mex.
Yoquivo, Chih., Mexico.
- Estes, Frank M., Jr., '02.**
Exploration Co. of England and Mexico,
Ltd., Apartado 740, Mexico City, Mexico.
- Evans, Henry R., '00.**
City Engineer, Williston, N. D.
- Evans, Willis W., '08.**
Deceased.
- Everest, Herbert A., '08.**
511 East 10th St., Oklahoma City, Okla.
- Ewing, Charles R., '00.**
U. S. Mineral Surveyor, Del Norte, Colo.
- Eye, Clyde M., '95 (life).**
Superintendent, Colorado Mining Co., Aro-
roy, Island of Masbate, P. I.
- Farnam, Lynn C., '09.**
1405 Yale Place, Minneapolis, Minn.
- Farrar, Russell J., '10 (1911).**
Salem, Oregon.
M. N. W. Ry., Caballo, via Peasen, Camp
C. B. No. 1, Chihuahua, Mexico.
- Febles, John C., '97.**
Chemist, Anaconda Copper Co., Box 105,
Butte, Mont.
- Field, Fred M., '95 (life).**
872 24th St., Ogden, Utah.
- Fillius, Lee L., '04.**
Cyanide Department, Smuggler Union Co.,
Telluride, Colo.
- Filteau, C. A., '07 (life).**
941 17th Ave., Denver, Colo.
- Finigan, William H., '06 (1910).**
MacGowan & Finigan, 42 Gay Bldg., St.
Louis, Mo.
Box 172, Socorro, N. M.
- Fitz Gerald, Ronald P., '10 (1911).**
Roswell, N. M.
- Fleming, William L., '03.**
- Fiint, F. F., '05.**
R. F. D. No. 4, Greeley, Colo.
- Floyd, John A., '88.**
Deceased.
- Ford, Homer D., '05 (1910).**
290 South Grant Ave., Denver, Colo.
Superintendent, Gilson Asphaltum Co.,
Dragon, Uintah Co., Utah.
- Foster, George C., '03.**
521 East 18th Ave., Denver, Colo.
- Franck, Albert C., '04 (life).**
3807 4th St., San Diego, Cal.
- Franck, Robert P., '04.**
Civil Engineer, 3807 4th St., San Diego,
Calif.
- Frank, Harry L., '01 (life).**
Box 1436, 37 Jacobson Bldg., Denver, Colo.
- Frank, Morton E., '06 (1911).**
McPhee Bldg., Denver, Colo.
Stratford Hotel, Chicago, Ill.
- Freeland, William H., '06.**
Deceased.
- French, Burr J., '08.**
1622 Tremont St., Denver, Colo.
Canelas, Durango, Mexico.
- French, Sidney W., '08 (1911).**
2525 Elm St., Denver, Colo.
Florence, Colo.
- Frick, Frederick F., '08.**
203 East Main St., Peru, Ind.
Anaconda Copper Mining Co., 508 Locust
St., Anaconda, Mont.
- Friedhoff, W. H., '07 (life).**
910 East Ellsworth St., Denver, Colo.
Mineral Inspector, U. S. Land Office, Hel-
ena, Mont.
- Fry, Louis D., '03 (life).**
Superintendent, Saltillo Smelter, The Maz-
ipil Copper Co., Ltd., Apartado 64, Sal-
tillo, Coah, Mexico.
- Funk, Walter A., '03 (1910).**
Idaho Springs, Colo.
- Galligan, John T., '11.**
Idaho Springs, Colo.
- Gardner, John I., '06 (life).**
1984 Holden St., Denver, Colo.
Mill Superintendent, Vanadium Mines Co.,
Cutter, N. M.
- Garnett, Thomas H., '11.**
1315 Court St., Pueblo, Colo.
City Engineer's Office, Butte, Mont.
- Garza, A. J. M., '05.**
- Geary, Richard E., '09.**
404 Oregonian Bldg., Portland, Ore.
M. N. W. Ry., Caballo, via Peason, Camp
C. B. No. 1, Chihuahua, Mexico.

- Gehrman, Charles A., '86 (life).
Mills Bldg., San Francisco, Calif.
- Geib, Karl V., '11 (1911).
1055 Mariposa St., Denver, Colo.
- Geisel, C. R., '07.
2714 East 13th Ave., Denver, Colo.
Engineer, Denver Union Water Co.
- Geringer, George T., '10 (1911).
3485 Coleram Ave., Cincinnati, Ohio.
General Manager, Premier Coal and Lumber Co., Wilhurst, Breathitt Co., Ky.
- Giddings, Donald S., '00.
Chemist, New Portland Mill.
Portland G. M. Co., Victor, Colo.
- Gilbert, Arthur K., '06 (1910).
Box 642, Greeley, Colo.
- Gilbert, William J., '06 (1910).
Box 642, Greeley, Colo.
2215 West 34th Ave., Denver, Colo.
- Glasgow, Charles M., '10.
4371 Washington Ave., St. Louis, Mo.
Assayer, Revenue Tunnel Mines Co., Snelfels, Colo.
- Goe, Harold H., '08.
1727 Waveland Ave., Chicago, Ill.
Anaconda Copper Mining Co., Box 80, Anaconda, Mont.
- Golden, J. P., '07 (1911).
1248 Pennsylvania St., Denver, Colo.
Mineral Inspector, U. S. Land Office, 712 E. & C. Bldg., Denver, Colo.
- Goodale, F. A., '10 (1910).
1368 Garfield St., Denver, Colo.
- Goodale, Stephen L., '04 (life).
Professor of Mining, School of Mines, University of Pittsburg, Pittsburg, Pa.
- Gordon, John G., Jr., '06 (1911).
7327 Elm Ave., St. Louis, Mo.
Apartado 25, Guanajuato, Gto, Mexico.
- Gow, P. A., '07 (1910).
City Engineer, Butte, Mont.
- Grant, Lester S., '99 (life).
421 Spicer Ave., Victor, Colo.
Superintendent, Isabella G. M. Co., Victor, Colo.
- Gray, Latimer D., '95.
Manager, Electrical Dept., U. P. Coal Co., Rock Springs, Wyoming.
- Greve, E. E., '05 (life).
- Grider, R. L., '05 (life).
268 East 14th St., Eugene, Ore.
Vanadium Mines Co., Cutter, N. M.
- Griffith, John R., '09 (life).
151 Archer Place, Denver, Colo.
Assistant Chemical Engineer, Norton Co., 122 1st St., Niagara Falls, N. Y.
- Griswold, George G., '96 (life).
Box 566, Golden, Colo.
Superintendent, The Ophir Gold Mines, Milling and Power Co., Ophir, Colo.
- Gross, John, '97 (life).
Draper & Gross, Mining Engineers, 745 Equitable Bldg., Denver, Colo.
- Hale, General Irving, Hon.
General Manager, General Electric Co., First National Bank Bldg., Denver, Colo.
- Hallett, Alfred F., '09 (1911).
1200 Vine St., Denver, Colo.
Kokomo Metals Co., Kokomo, Colo.
- Hallett, R. L., '05 (1911).
1200 Vine St., Denver, Colo.
Smelter Superintendent, Sandoval Zinc Co., Sandoval, Ill.
- Hallett, William J., '05.
1200 Vine St., Denver, Colo.
Chief Engineer, U. P. Coal Co., Rock Springs, Wyo.
- Hamilton, Frank R., '98.
Hamilton, William J., '09.
Granby Smelter.
Grand Forks, British Columbia, Canada.
- Hammond, John Hays, Hon., '09 (1911).
Mining Engineer, 71 Broadway, New York, N. Y.
- Hammond, William L., '09 (1911).
Box 53, Saguache, Colo.
- Hansen, Charles L., '09 (1911).
Box 32, R. F. D. No. 2, Fullerton, Calif.
Investor Mining and Leasing Co., Wallstreet, Colo.
- Harkison, Charles W., '06 (1910).
Golden, Colo.
Boise Laboratories Co., 227 South 10th St., Boise, Idaho.
- Harrington, Daniel, '00 (1911).
General Manager, Big Horn Colliers Co., Crosby, Wyo.
- Harrington, Orville, '98 (life).
1485 South University St., Denver, Colo.
Assistant Secretary, etc., C. S. M. Alumni Association, Golden, Colo.
- Harris, Morrison, '08 (life).
St. Martins, Philadelphia, Pa.
- Harris, Willard F., '01 (1911).
General Superintendent, Socorro Mines Co., Mogollon, N. M.
- Harrison, Thomas S., '08 (1911).
711 17th St., Denver, Colo.
Cody, Wyoming.
- Hartzell, Lester J., '95 (life).
912 West Galena St., Butte, Mont.
Professor of Chemistry, Montana School of Mines, Butte, Mont.
- Harvey, John V., '11 (1911).
Box 254, 1201 18th St., Sioux City, Iowa.
Ojuelos, Jalisco, Mexico.
- Hawley, R. H., '93 (1911).
Utah Copper Co., Garfield, Utah.
- Hazard, William J., '97 (life).
Professor of Electrical Engineering, Colorado State School of Mines, Box 246, Golden, Colo.
- Heitz, George H., '06 (1911).
1249 Stout St., Denver, Colo.
McNair & Heitz, Mining Engineers, Box 526, Leadville, Colo.
- Hensley, James H., Jr., '06.
Mining, Box 100, Miami, Ariz.
- Herres, Otto, Jr., '11.
1728 Race St., Denver, Colo.
- Hewitt, A. F., '05 (life).
2143 Grove St., Denver, Colo.
Consulting Engineer, 221 McPhee Bldg., Denver, Colo. Deputy State Engineer, State Capitol, Denver, Colo.
- Hill, Frank C., '04.
Clear Creek, Utah.
- Hills, Leon P., '08.
Tuolumne, Calif.

- Hilton, Howard J., '10 (1911).
Box 252, Golden, Colo.
Civil and Mining Engineer, Box 172, Ver-
nal, Utah.
- Hindry, Willis E., '92.
Mining Engineer, Box 122, Pasadena,
Calif.
- Hodgson, Arthur R., '99 (life).
Assayer, U. S. Mint, Denver, Colo.
- Hollis, D. D., '07 (1910).
Silverton, Colo.
U. S. Land Office, Portland, Oregon.
- Hombein, Julius, '05 (1911).
2351 Clarkson St., Denver, Colo.
- Howat, A. M., '07.
57 7th East St., Salt Lake, Utah.
Mining Engineer, U. S. Smelting, Refining
and M. Co., 908 W. P. Story Bldg., Los
Angeles, Calif.
- Hoyt, George F., '96.
Hubbard, John V., '10 (1911).
1234 W. Kinzie St., Chicago, Ill.
25 Cheyenne Blvd., Colorado Springs,
Colo.
- Hull, Cecil B., '09 (1911).
1735 Gaylord St., Denver, Colo.
Wood & Hull, Mining Engineers, 618 E. &
C. Bldg., Denver, Colo.
- Hunt, Harry D., '09 (1911).
2126 E. Lombard St., Baltimore, Md.
Chemist, Miami Copper Co., Miami, Ariz.
- Hunt, T. R., '05 (1911).
2941 Denver Place, Denver, Colo.
La Belle Mining Co., Vicksburg, Ariz.
- Hyder, C. A., '05 (1911).
3337 West 33rd Ave., Denver, Colo.
Hyder & Hyder, Mining Engineers, Mocte-
zuma, Sonora, Mexico.
- Hyder, Frederick B., '03 (1911).
3337 West 33rd Ave., Denver, Colo.
Hyder & Hyder, Mining Engineers, Na-
cozari, Sonora, Mexico.
- Ickis, Harry M., '02.
Deceased.
- Ingersoll, Julius C., Jr., '06 (life).
3131 East 4th Ave., Denver, Colo.
Ingersoll, Bell & James, Assayers and
Mining Engineers, Ouray, Colo.
- Ingols, James A., '98 (life).
Mining Engineer, Milford, Utah.
- Ireland, Carrol B., '08.
2503 Dunkeld Place, Denver, Colo.
Capitol Mill, Georgetown, Colo.
- Isom, E. W., '07 (1911).
767 The Rookery, Chicago, Ill.
Mining Superintendent, Yukon Gold Co.,
Dawson, Y. T., Canada.
- Iwai, Kyosuke, '09 (life).
Ornigawa-Muchi, Katou-gori, Chikara,
Japan. Yoshinotain Coal Mining Co.,
31 Akashicho, Tsukiyi, Tokio, Japan.
- Izett, Glenn, '03.
1163 Welton St., Denver, Colo.
764 Gas and Electric Bldg., Denver, Colo.
- Jackson, Walter H., '01.
Vienna, Ill.
- Jacques, Harry L., '08 (1911).
1521 Utica St., Denver, Colo.
Los Angeles Aqueduct, Superintendent of
Construction, Inyokern, Kern Co., Calif.
- Jarvis, Royal P., '97 (1911).
1700 Corwell Ave., Knoxville, Tenn.
Professor of Mining and Metallurgy, Uni-
versity of Tennessee.
- Jewel, Gilbert E., '93.
Johnson, Byron M., '08.
Sylvan Home, Alexandria, Minn.
- Johnson, Edward W., '91.
Garfield Smelting Co., Salt Lake, Utah.
- Johnson, Gilbert, Jr., '99.
Deceased.
- Johnson, Junius W., '01 (life).
Deputy State Engineer, State Capitol, Den-
ver, Colo.
- Johnson, Lafayette G., '04.
Mining Superintendent, Federal Lead Co.,
Flat River, Mo.
- Johnston, Fred, '98 (1911).
Assistant Superintendent, A. V. Smelter,
Leadville, Colo.
- Jones, Edward B., '00.
Mining Engineer, Box 502, Salt Lake City,
Utah.
- Jones, Ernest F., '10 (1911).
Los Esperanzas, Coah, Mexico.
Engineer, Cia Carbonifera Agujita y An-
exas, S. A., Lampacitos, Coah, Mexico.
- Jones, Mrs. F. H., '98.
Box 306, Jerome, Idaho.
- Jones, Frank H., '98.
Mining Engineer, Box 306, Jerome, Idaho.
- Jones, Fred, '00.
Mining Engineer, Portland Gold Mining
Co., Victor, Colo.
- Jones, Percy, Jr., '08 (1911).
Box 1016, Tucson, Ariz.
Chief Engineer, Gila Valley Electric, Gas
and Water Co., Safford, Ariz.
- Jones, Vincent K., '10 (1910).
333 Corona St., Denver, Colo.
Cuervo, Guadalupe Co., N. M.
- Jones, W. A., Jr., '08.
Ware Neck, Gloucester Co., Virginia.
- Juchem, Harold H., '10 (1911).
Arvada, Colo.
El Tajo Mining Co., Poza, Sonora, Mexico.
- Keeney, Robert M., '10 (1910).
Somerville, Conn.
Instructor in Metallurgy, C. S. M., Golden,
Colo.
- Kell, Wayne S., '06.
Professor of Mining, Georgia School of
Technology, Atlanta, Ga.
- Kelley, Fred G., '99.
Kelly, William A., '97 (life).
1272 Columbine St., Denver, Colo.
Chloride, N. M.
- Kelso, Duane C., '10 (1911).
618 South Pennsylvania St., Denver, Colo.
- Kennedy, George A., '95 (life).
Mining Engineer, 2741 Boulevard F, Den-
ver, Colo.
- Kenner, A. R., '07.
3434 Rhodes Ave., Chicago, Ill.
Mining Engineer, with Osgood, Carter &
Co., Consulting Engineers, 403-4 First
Nat. Bank Bldg., Chicago, Ill.
- Kerr, Victor E., '00 (1911).
Mining Engineer, 744 Spruce St., Boulder,
Colo.

- Kilbourn, William D.**, '04 (1910).
Murray Plant, A. S. & R. Co., Murray, Utah.
- Kilgour, Hamilton**, '08 (life).
Consulting Engineer, Holly Hall, Harrison St., East Orange, N. J.
- Kimball, George K.**, '92 (life).
General Manager, Old Town Mining Co., Idaho Springs, Colo.
- Kimball, Harlow M.**, '04.
Architect, 275 Argyle Ave., Hollywood Station, Los Angeles, Calif.
- Kimball, Joseph S.**, '92.
Box 376, Central City, Colo.
- King, Henry E.**, '03.
Assistant City Engineer, 419 East Kiowa St., Colorado Springs, Colo.
- Kingman, Jerry**, '88.
Deceased.
- Kirchman, Robert I.**, '09 (1911).
Kappa Sigma House, Golden, Colo.
Hurley, N. M.
- Kleff, J. M.**, '06 (life).
Mining Engineer, Box 804, Leadville, Colo.
- Knight, Hal G.**, '08 (1911).
1571 Steele St., Denver, Colo.
Superintendent, Glacier Creek Gold Mining Co., Porcupine, Alaska.
- Knight, R. E.**, '07.
2324 Williams St., Denver, Colo.
Assistant Cashier, Alliance National Bank, Alliance, Neb.
- Knowles, Benjamin W.**, '08 (1911).
1320 Detroit St., Denver, Colo.
Engineer, Daly Reduction Co., Hedley, B. C., Canada.
- Koch, William F.**, '11 (1911).
539 Oakdale Ave., Chicago, Ill.
Demonstrator, E. I. Du Pont de Nemours Powder Co., Central Savings Bank Bldg., Denver, Colo.
- Koerner, Albert J.**, '06 (life).
226 Temple Court Bldg., Denver, Colo.
- Kraemer, Edward L.**, '98 (life).
Yampa Smelting Co., Bingham Canyon, Utah.
- Krueger, G. S.**, '07.
Longmont, Colo.
Daly Judge Mining Co., Park City Hotel, Park City, Utah.
- Kruger, Herman A.**, '09 (1911).
2937 York St., Denver, Colo.
Superintendent, San Juan Mine, via Minera de Penoles, Ojuela, Durango, Mex.
- Lampe, Oscar A.**, '98.
Langrall, Charles A., '08.
2227 East Baltimore St., Baltimore, Md.
Miami Copper Co., Miami, Ariz.
- Lannon, F. P., Jr.**, '07 (life).
320 East 2nd St., Pueblo, Colo.
U. S. Zinc Smeltery, Pueblo, Colo.
- Lannon, James A.**, '11.
1024 North Main St., Pueblo, Colo.
- Larison, E. L.**, '05 (1911).
Superintendent, Acid Department, Ducktown Sulphur, Copper and Iron Co., Box 106, Isabella, Tenn.
- Larsh, Walter S.**, '04.
Mining Engineer, 2261 West 21st St., Los Angeles, Calif.
- Latimer, Bertrand J.**, '10.
Golden, Colo.
Mining Engineer, care L. N. Jones, Sombrette, Zacatecas, Mexico.
- Laughlin, Samuel W.**, '10 (1911).
Rockville, Mo.
B. & M. Mining Co., Box 678, Butte, Mont.
- Laurance, Bert M.**, '11 (1911).
1206 D St., San Bernardino, Calif.
- Lee, Frank W., Jr.**, '11.
3447 Bryant St., Denver, Colo.
- Lee, George M.**, '10 (1910).
707 North 20th St., Boise, Idaho.
Granby Smelter, Box "N," Granby, B. C., Canada.
- Lee, Robert P.**, '05 (1911).
Deceased.
- Lee, Wallace**, '04.
Leeke, Dana W., '10 (1911).
Upland, Calif.
Utah Copper Co., Garfield, Utah.
- Lehmer, Frank W.**, '02.
1822 Emmett St., Omaha, Neb.
Manager, Compania Minera Zapotca, Ocotlan, Oaxaca, Mexico.
- Lemke, Carl**, '00 (1911).
Superintendent, American Zinc Extraction Co., Leadville, Colo.
- Lennox, Luther W.**, '05 (1911).
1339 North Nevada Ave., Colorado Springs, Colo.
New Portland Mill, Portland G. M. Co., Box 202, Victor, Colo.
- Lerchen, F. H.**, '97 (1910).
Kelley, New Mexico.
- Lesh, Herbert B.**, '10.
Suite 1014, 111 Broadway, New York, N. Y.
- Leshner, Carl E.**, '08.
La Junta, Colo.
Classifier, U. S. Geological Survey, Washington, D. C.
- Levy, Archibald L.**, '06 (life).
3238 Vernon Ave., Chicago, Ill.
- Lewis, Alfred S.**, '05 (1910).
1575 Pennsylvania Ave., Denver, Colo.
Red Hills Mines Co., Hatchita, New Mexico.
- Lewis, Frank E.**, '01 (1911).
1007 South Race St., Denver, Colo.
Revenue Tunnel Mines Co., Sneffels, Colo.
- Lewis, William B.**, '92 (life).
Vice-President, The Securities Corporation, Ltd., 40 Wall St., New York, N. Y.
- Lewis, William M.**, '09.
129 N. Albans St., St. Paul, Minn.
- Libby, James L.**, '06 (life).
1920 Max St., Cheyenne, Wyo.
Assistant Engineer, U. P. Coal Co., Rock Springs, Wyo.
- Liddell, Charles A.**, '03.
412 Nicollet Ave., Minneapolis, Minn.
Mining Engineer, Liddell & Liddell, Jarbidge, Nevada.
- Liddell, T. P.**, '03.
412 Nicollet Ave., Minneapolis, Minn.
Mining Engineer, Liddell & Liddell, Battle Mountain, Nevada.
- Limbach, Edmund C.**, '95.
Receiver, Palmer Mt. Tunnel Co., Loomis, Wash.

- Link, Karl G.**, '08 (life).
1641 Gaylord St., Denver, Colo.
Apartado 25, Guanajuato, Gto, Mexico.
- Logue, N. W.**, '97.
Lonergan, P. Jay, Jr., '05 (1910).
Professor of Mining, Imperial University, Peking, China.
- Lorah, Bela J.**, '88.
Deceased.
- Lovering, Ira G.**, '01 (1911).
1327 South 9th St., Denver, Colo.
Cleote, Coah, Mexico, via Sabinas.
- Lowell, James B.**, '08.
24 Brattle St., Worcester, Mass.
- Lucy, Frank Allen**, '01.
Deceased.
- Lucy, Richard W.**, '98 (life).
1127 Bannock St., Denver, Colo.
Assistant Engineer, D. L. & N. W. R. R.
- MacGregor, George H.**, '97 (life).
Irrigation Engineering, Box 156 Saratoga, Wyo.
- Magenan, William**, '98 (life).
Mining Engineer, Apartado 30, Gomez Palacio, Durango, Mexico.
- Malmstrom, C. C.**, '00 (life).
Assistant Assayer, U. S. Mint, Denver, Colo.
- Marrs, George O.**, '01.
Irrigation Engineer, 1632 York St., Denver, Colo.
- Marshall, Emory M.**, '11 (1911).
1210 West 8th St., Des Moines, Iowa.
Mining, Mogollon, N. M.
- Martin, J. A.**, '07 (1911).
693 East 18th St., Paterson, N. J.
Assistant Engineer, Superior Coal Co., Box 106, Superior, Wyo.
- Matheson, Kenneth H.**, '11.
Hugo, Colo.
Western M., M. & Leasing Co., Salida, Colo.
- Matteson, Wallace G.**, '11.
258 Kirk Ave., Syracuse, N. Y.
Haines, Alaska.
- Maxwell, Fred A. G.**, '95 (life).
Metallurgist, Randfontein Estates Co., Box 2, Randfontein, Transvaal, South Africa.
- May, Arthur L.**, '11.
1105 8th Ave., Beaver Falls, Pa.
- May, John G.**, '01 (1911).
Mining Engineer, Oxford Hotel, Denver, Colo.
- Mayer, Walter J.**, '11 (1911).
821 Boston Bldg., Salt Lake, Utah.
Boston Cons. Mine, Bingham Canyon, Utah.
- Maynard, Rea E.**, '96 (life).
419 South Commonwealth Ave., Los Angeles, Calif.
- McCallum, Jean**, '10 (1911).
3775 Osceola St., Denver, Colo.
Utah Copper Co., Box 1038, Garfield, Utah.
- McCart, Robert**, '05 (life).
Manager, Inde Gold Mining Co., Inde, Durango, Mexico.
- McCormick, David F.**, '10 (1911).
216 Denver St., San Antonio, Texas.
Socorro Mines, Mogollon, N. M.
- McDaniels, Alexander K.**, '01.
Examining and Consulting Mining Engineer, 17 West 3rd Ave., Denver, Colo.
- McDermutt, Grace C. N.**, '03.
(Mrs. Barry Milligan).
Bureau of Standards, 1314 Wallach Place, N. W., Washington, D. C.
- McDonald, Jesse F., Hon.** (1911).
1151 Logan St., Denver, Colo.
Mining Operator, Box 257, Leadville, Colo.
- McElvenny, Robert F.**, '03.
Superintendent, Tacoma Plant, A. S. & R. Co., Tacoma, Wash.
- McHugh, Philip M.**, '11 (1911).
809 S. Kline St., Aberdeen, S. D.
Experimental Testing Work, Granite Bi-metallic Co., Golden, Colo.
- McKay, Glover S.**, '10 (1911).
Townsend, Mont.
Engineer, American Smelter Securities Co., Dolores Mine, Matehula, S. L. P., Mexico.
- McLeod, J. N.**, '97.
R. F. D. No. 1, Loup City, Neb.
- McMahan, Charles H.**, '92 (life).
Mining Engineer, 1217 Adams St., Denver, Colo.
- Medell, William S.**, '95 (1911).
Instructor in Chemistry, C. S. M., Golden, Colo.
- Merryman, Herbert E.**, '95 (1911).
U. S. Deputy Mineral Surveyor, Enterprise, Oregon.
- Merwin, E. W.**, '03.
510 Grant Bldg., Los Angeles, Calif.
- Middlekamp, L. L.**, '05 (1911).
Superintendent, Ellamar Mining Co., Ellamar, Alaska.
- Middleton, William B.**, '83.
Millard, Frank W., '01 (life).
Mining Engineer, Ely, Nevada.
- Miller, De Mont G.**, '09 (1910).
1044 Georgia St., Los Angeles, Calif.
Cyanide Superintendent, United Gold M. Co., Congress, Ariz.
- Milliken, John T.**, '96 (1911).
Consulting Engineer, Golden Cycle M. Co., Colorado Springs, Colo.
- Milliken, William B.**, '93 (life).
Mining and Metallurgical Engineer, 1407 Josephine St., Denver, Colo.
- Mitchell, George B.**, '96 (life).
Contracting Civil Engineer, 366 Kensington Ave., Montreal, P. Q., Canada.
- Montrose, James F.**, '02.
2200 Bellaire St., Denver, Colo.
Montrose & Son, 1640 Market St., Denver, Colo.
- Moore, C. F.**, '07.
Deceased.
- Moore, George P.**, '07 (life).
Newfane, Vt.
Consulting Engineer, Hewitt & Moore, 221 McPhee Bldg., Denver, Colo.
- Moss, Cleveland O.**, '02 (1910).
1730 Williams St., Denver, Colo.
705 Security Bldg., Los Angeles, Cal.
- Moynahan, Ambrose E.**, '00.
Assayer and Mining Engineer, Alma, Colo.

- Muir, David, '99.
Yaalpom, Shasta Co., Calif.
- Muir, Douglas, '05.
Superintendent of Mines, Guanajuato Reduction and Mines Co., Guanajuato, Gto., Mexico.
- Murch, Clarence H., '08.
153 W. Ellsworth Ave., Denver, Colo.
Mining and Assaying, Ashcroft, Colo.
- Nagel, Frank J., '03 (1911).
Apartado 133, Parral, Chih., Mexico.
- Nagel, Henry P., Jr., '04 (1910).
Vindicator Con. G. M. Co., Independence, Colo.
- Nance, William H., '96.
Assayer, Ohio and Colo. Smelter, Box 178, Salida, Colo.
- Nelson, H. E., '97.
Nengebauer, Karl E., '06 (life).
914 S. Union Ave., Pueblo, Colo.
Engineer, The Rio Tinto Copper Co., Terrazas, Chih., Mexico.
- Neville, J. B., Jr., '05.
Newnam, William E., '96 (1911).
Superintendent, Pattinson Plant, A. S. & R. Co., Omaha, Neb.
- Nicholson, George W., '00.
Queen Esther Mining Co., Box 31, Mojave, Calif.
- Norman, J. E., '98 (1910).
1343 High St., Denver, Colo.
Mining Engineer, 302 Exchange Bldg., Denver, Colo.
- Norton, A. C., '07 (1911).
Civil and Mining Engineer, 321 Raton Ave., La Junta, Colo.
- Nyeberg, H. E., '06 (life).
205 Court St., Pueblo, Colo.
Engineer and Assistant Superintendent, Tezuitlan Copper Co., Aire Libre, Puebla, Mexico.
- Nye, Robert, '97 (1911).
Superintendent, Idaho-Maryland Dev. Co., Grass Valley, Calif.
- O'Byrne, Joseph F., '05.
Mining Engineer, Jarbridge, Elko Co., Nev.
- Olsen, Charles O., '11.
707 Kiernan Ave., Spokane, Wash.
- Osborne, Arthur H., '93 (1911).
U. S. Deputy Mineral Surveyor, Georgetown, Colo.
- Page, Lawrence C., '08.
22 Bank St., Norfolk, Va.
- Palsgrove, Harry G., '03.
Dolores Mines Co., Madera, Chih., Mexico.
- Paredes, Evaristo, Jr., '05 (1910).
General Manager, La Prieta Mining Co., Cosala, Sinaloa, Mexico.
- Parker, James H., '95.
13-14 Masonic Temple, El Paso, Texas.
- Parks, George A., '06 (1911).
3347 Boulevard F, Denver, Colo.
U. S. Land Office, Mineral Examiner, Seward, Alaska.
- Parrish, Karl C., '01 (life).
Mining Engineer, 1822 Ingersoll Ave., Des Moines, Iowa.
- Parsons, F. H., '07.
661 East 23rd St., Paterson, N. J.
- Olalla, B. C., Canada.
- Parsons, Horace F., '03.
505 Jefferson St., Portland, Ore.
- Patrick, William B., '09 (1911).
Drawer C, Goldfield, Nev.
- Patterson, S. B., Jr., '06.
Mining Engineer, Anaconda Copper Co., 307 W. 3rd St., Anaconda, Mont.
- Paul, Russell B., '02.
2119 Marion St., Denver, Colo.
Mining Engineer, Empire Zinc Co., 703 Symes Bldg., Denver, Colo.
- Paul, William H., '09 (life).
Manager, Dolores Mines Co., Madera, Chih., Mexico.
- Pendery, John M., '00.
136 West 7th St., Leadville, Colo.
- Perkins, Alfred S., '10 (1911).
Otrago, Mich.
Mining Engineer, Titanium Alloys Co., 15 Wall St., New York, N. Y.
- Pfeiffer, G. N., '05 (life).
Care O. J. Heely, Box 5, St. Hilory, Ill.
- 139 Kings Road, Corvallis, Ore. (temp.).
- Phelps, Harlow D., '10 (1911).
1231 Grant Ave., Denver, Colo.
- Phelps, W. B., '07.
912-920 E. 3rd St., Los Angeles, Calif.
Mining Engineer.
- Pilger, Newton W., '06 (life).
Anaconda Copper Mining Co., 626 Hennessey Bldg., Butte, Mont.
- Platt, Edwin H., '00.
Manager, Revenue Tunnel Mining Co., Sneffels, Colo.
- Post, George M., '94 (life).
1711 Race St., Denver, Colo.
- Powell, George F., '97 (life).
Manager, El Tajo Mining Co., Poza, Sonora, Mexico.
- Powers, Oliver, '02.
602 Park St., Lawton, Oklahoma.
- Pray, Milton A., '08.
Wadsworth, Nev.
- Pray, Winfred A., '01.
Box 426, Fernley, Nev.
- Pressler, L. P., '05 (1911).
Business Manager, Ozark S. & M. Co., Magdalena, N. M.
- Price, Lyttleton, Jr., '00 (life).
General Engineering and California Oil, 712 Security Bldg., Los Angeles, Calif.
- Prier, Truman D., '04 (life).
Engineer, Conrey Placer Mining Co., Ruby, Mont.
- Prout, John, '00 (1911).
Golden, Colo.
- Pullen, Lester L., '10 (1911).
2591 Ash St., Denver, Colo.
Inde G. M. Co., Inde, Durango, Mexico.
- Purdy, Irvine A., '10 (1911).
Mogul Club, Pluma, S. D.
- Putnam, George B., '05.
Deceased.
- Quayle, T. W., '07 (1911).
236 W. 3rd Ave., Denver, Colo.
- Rabb, E. M., '05 (1911).
3535 W. 24th Ave., Denver, Colo.
Chief Engineer, Los Pilares Mine, Moctezuma Copper Co., Nacozari, Sonora, Mexico.

- Rambo, W. C. J., '09 (life).
1448 De Kalb St., Norristown, Pa.
Mining Engineer, 846 Equitable Bldg., Denver, Colo.
- Rath, C. M., '05 (1911).
Box 335, Cheyenne, Wyo.
184 N. Linden Ave., Sheridan, Wyo.
- Reinhard, Frank J., '05.
Deputy County Treasurer, Golden, Colo.
- Reno, Charles F. A., '08.
19 E. Williamette St., Colorado Springs, Colo.
Cosala, Sinaloa, Mexico.
- Reno, Horace T., '02.
Arvada, Colo.
- Rhodes, William B., '03 (life).
San Jose de Gracia, Sinaloa, Mexico.
- Rich, Joseph U. G., '08 (life).
511 2nd Ave., South, Nashville, Tenn.
- Richards, E. R., '05.
Superintendent, Pinguico Mine and Mill, Apartado 25, Guanajuato, Gto., Mexico.
- Richards, John V., '02 (1911).
Mining Engineer, 1002 National Bank Bldg., Spokane, Wash.
- Ripley, George C., '06.
Care Dr. F. D. Weisse, 108 E. 30th St., New York, N. Y.
Colorado Mining Co., Aroroy, Island of Masbate, P. I.
- Rising, Arthur F., '99.
Deceased.
- Ristedt, Ernest J., '09.
Aurora, Denver, Colo.
Chemist, Miami Copper Co., Miami, Ariz.
- Robey, Lloyd, '00 (life).
1674 S. Pennsylvania St., Denver, Colo.
Honduras and Rosario Co., San Juancito, Honduras, C. A.
- Robinson, George P., '04 (1911).
Manager, Suriana Mining and Smelting Co., Campo Morado, via Balsas, Guerrero, Mexico.
- Rodriguez, J. C., '98.
6a De Hildalgo 2, Apartado 87, Saltillo, Mexico.
- Roller, Arthur H., '97 (1911).
Pres. and Gen. Mgr., Alice Gold Mines Corp., Idaho Springs, Colo.
- Root, Charles D., '08.
3120 Wyandotte St., Denver, Colo.
- Ross, George M., '07 (1910).
Golden, Colo.
El Tigre Mining Co., Yzabel, Sonora, Mex.
- Rowe, Charles E., '02 (life).
1711 Rio Grande St., Austin, Texas.
Professor of Mining and Metallurgy, University of Texas.
- Rowe, Edward E., '95.
3344 Shoshone St., Denver, Colo.
Manager, E. E. Rowe & Co., Pressed Brick.
- Royer, Frank W., '99.
Consulting and Mining Engineers, 522 Mutual Life Bldg., Mexico City, Mexico.
- Rudd, Arthur H., '00.
Joseph, Oregon.
- Russell, Donald O., '09 (life).
Kuala Lumpur, Selangor, Federated Malay States.
- Ryan, W. E., '05 (1911).
Care C. M. Ford, 1236 Ogden St., Denver, Colo.
Dolores Mine, Madera, Chih., Mexico.
- Sackett, Blair L., '09 (1911).
Care Clarence Sackett, 738 Broad St., Newark, N. J.
Chemist, Cerro de Pasco Smelter, La Fundicion, Peru, S. A.
- Saint Dizier, Julius L., '94.
Superintendent, Encinillas Smelting Co., Santa Rosalia, Chih., Mexico.
- Sale, Andrew J., '01 (1911).
2312 Marion St., Denver, Colo.
Mining Engineer, Giroux Cons. Mines Co., Kimberly, Nev.
- Sandusky, Samuel C., '08.
Salida, Colo.
Irrigation Engineer for Ellsworth-Klaner Cons. Co., Box I, Creede, Colo.
- Schafer, Louis, '09.
Lake City, Colo.
Leasing, Unexpected Mine, Hesperus, Colo.
- Scheble, Max C., '01 (1911).
Superintendent, Compania Carbonifera Aguijita, Lampacitos, Coah., Mexico.
- Schlereth, C. Q., '06 (life).
Summit Copper Co., Bellevue, Ariz.
- Schneider, August W., '11 (1911).
Arvada, Colo.
- Schneider, George W., '94 (life).
135 Logan St., Denver, Colo.
Mining Engineer, Quincy Bldg., Denver.
Professor of Mining, C. S. M., Golden, Colo.
- Schuman, Enrique A., '97.
- Shaver, F. J., '07.
San Jacinto, Calif.
- Shaw, Ralph H., '11 (1911).
Box 195, Aspen, Colo.
- Sherman, Scott H., '04 (1911).
Acting Superintendent, Gila Sulphide Co., Christmas, Ariz.
- Shetler, Waverly, '95.
Deceased.
- Showman, Harry M., '10 (1910).
339 Bannock St., Denver, Colo.
Instructor in Mathematics, C. S. M., Golden, Colo.
- Sill, Rush T., '06.
Oakland Place, S. 24th St., Fort Smith, Ark.
- Silver, Leopold, '10 (1911).
Care J. M. Silver, Glenwood Springs, Colo.
Box 1252, Ocean Park, Calif.
- Simpson, William P., '01.
Chemist and Assayer, Cia de Minerales y Metales, S. A.
Villaaldama, N. L., Mexico.
- Skavlem, Henry G., '10 (1911).
157 Prospect Ave., Janesville, Wis.
Surveyor and Sampler, Hollinger Gold Mines, Ltd., Aura Lake P. O., Ontario, Canada.
- Skinner, Lewis B., '95 (life).
Chemist and Metallurgist, Western Chemical Mfg. Co., Denver, Colo.
- Slater, Amos, '00 (life).
Mining Engineer, 1043 Henry Bldg., Seattle, Wash.

- Sloan, W. A., '03.
Chief Chemist and Metallurgist, Shannon Copper Co., Clifton, Arizona.
- Small, Harvey B., '01 (life).
Care A. Stegman, Barranquilla, Columbia, South America.
- Smith, C. Dupree, '91 (life).
968 Ogden St., Denver, Colo.
- Smith, Claude H., '00.
Deceased.
- Smith, E. M., '05 (1910).
Contracting Engineer, Smith Construction Co., Box 108, Ohanogan, Washington.
- Smith, Harry C., '98 (1910).
1116 E. 13th Ave., Denver, Colo.
Manager, El Tiro Copper Co.
- Smith, Roy F., '11 (1911).
2356 Humboldt St., Denver, Colo.
Doe Run Lead Co., Rivermines, Mo.
- Smith, Thomas G., '99.
Steptoe Valley M. and S. Co., McGill, Nev.
- Snow, Robert E., '11 (1911).
Greenwood, Custer Co., Colo.
- Soupcoff, Samuel M., '10.
417 N. Craig St., Pittsburg, Pa.
- Spangler, Howard, '05.
1337 York St., Denver, Colo.
Engineering Dept., Southern Calif. Edison Co., 329 San Fernando Bldg., Los Angeles, Calif.
- Spencer, Walter I., '04 (1910).
Manager, Portland Tool Works, Box 278, Portland, Ore.
- Stannard, Burt C., '95.
Tacoma Smelting Co., Tacoma, Wash.
- Starbird, Edwin P., '01 (1910).
2646 Magnolia Ave., Los Angeles, Calif.
- Starbird, H. B., '97 (1911).
Irrigation Engineer, 2646 Magnolia Ave., Los Angeles, Calif.
- Steele, James H., '00 (life).
1041 Lafayette St., Denver, Colo.
Instructor, M. T. H. School, Denver, Colo.
- Steinhauer, Fred C., '99 (life).
901 Humboldt St., Denver, Colo.
Park Superintendent, 214 City Hall, Denver, Colo.
- Stephens, Charles N., '98.
Stephens, Wallace A., '93.
1361 Logan St., Denver, Colo.
Mining, 621 Colorado Bldg., Denver, Colo.
- Stephenson, T. E., '06.
- Stockton, Robert S., '95 (life).
Superintendent of Operation and Maintenance, C. P. Ry. Irrigation Block, Strathmore, Alberta, Canada.
- Stoeckley, E. F., '05.
Canon City, Colo.
Care Manuel Salcido, Caborca, Sonora, Mexico.
- Storm, Lynn W., '02.
353 Sherman St., Denver, Colo.
- Stotesbury, H. W., '07 (1911).
Leadville, Colo.
Chief Engineer, Tonopah M. Co. of Nevada, Tonopah, Nev.
- Street, Gerald B., '01 (1910).
504 Dooley Bldg., Salt Lake, Utah.
Mining Engineer, Du Pont de Nemours Powder Co., Wilmington, Del.
- Strohl, George F., '10 (1911).
918 13th St., Greeley, Colo.
Tennessee Copper Co., Ducktown, Tenn.
- Strout, Fred McL., '96 (1911).
Assayer, 371 E. Bennett Ave., Cripple Creek, Colo.
- Stuart, Malcolm M., '08.
1356 Pearl St., Denver, Colo.
- Suhr, Otto B., '95 (life).
Box J, Niagara Falls, N. Y.
- Swainson, Otis W., '10 (1910).
145 Logan St., Denver, Colo.
U. S. Coast and Geodetic Survey, 412 Federal Bldg., Seattle, Wash.
- Taggart, George K., '03 (1910).
270 Worth St., Dallas, Texas.
Superintendent, Llano Mining and Milling Co., Llano, Sonora, Mexico.
- Taggart, Oliver R., '09 (1911).
1638 High St., Denver, Colo.
- Taylor, Harry Picotte, '00 (life).
712 Security Bldg., Los Angeles, Calif.
- Terrill, A. C., '05 (1910).
310 E. Monument St., Colorado Springs, Colo. 138 2nd St., Glendale, Calif.
- Tescher, Samuel, '04.
513 Colorado Bldg., Denver, Colo.
- Thomas, John S., '04.
Deceased.
- Thomson, A. T., '05 (1911).
Box 148, Pueblo, Colo.
Chemist, Ohio and Colorado Smelter, Salida, Colo.
- Thomson, Francis A., '04 (1910).
Professor of Min. and Met., State College of Washington, Box 15, Pullman, Wash.
- Thompson, James S., '99 (life).
Division Superintendent, C. F. and I. Co., 510 Bank Bldg., Trinidad, Colo.
- Thum, Ernest E., '06.
2303 Emerson St., Denver, Colo.
B. & M. Smelting Co., Great Falls, Mont.
- Thurston, Ralph V., '11 (1911).
Payette, Idaho.
- Titworth, Frederick S., '95 (life).
Lawyer, 404 Equitable Bldg., Denver, Colo.
Mining Law Lecturer, C. S. M.
- Townsend, Arthur R., '99 (1910).
25 Broad St., New York, N. Y.
- Trott, Maynard J., '08.
1017 N. Hancock Ave., Colorado Springs, Colo. Chemist, Golden Cycle Mill.
- Trott, Roland S., '06.
Mining Engineer, Box 963, Denver, Colo.
- Trumbull, Loyal W.
Manager, Const. Dept. Rock Creek Conservation Co., Rock River, Wyo.
- Tyler, Sidney B., '99 (life).
General Manager, Frontenac Cons. Mines Co., Ltd., Central City, Colo.
- Utley, Howard H., '00.
Superintendent, Arizona and Parral M. Co., Parral, Chih., Mexico.
- Vacek, Vincent F., '10 (1911).
312 N. 24th St., South Omaha, Neb.
Ray, Arizona (temp.).
- Valentine, Malvern R., '98 (1911).
Copeland Sampling Co., Box 108, Victor, Colo.

- van Diest, Edmund C., '89 (1911).
Civil and Mining Engineer, Box 82, Colorado Springs, Colo.
- Van Wagenen, Hugh R., '06.
Mining Engineer, Asst. to Allen H. Rogers, Rm. 1418, 71 Broadway, New York, N. Y.
- Vaughn, Robert M., '04.
Deceased.
- Voelzel, Gustave W., '11 (1911).
2050 Curtis St., Denver, Colo.
Smuggler Mine, Aspen, Colo.
- Wackenhut, George J., '04 (1911).
531 E. Pike's Peak Ave., Colorado Springs, Colo.
Copeland Sampling Co., Box 108, Victor, Colo.
- Wallace, Howard J., '04.
Wabuska, Nevada.
- Wallace, Louis R., '95.
Superintendent Smelting, Phelps, Dodge & Co., Morenci, Ariz.
- Waltman, Will D., '99 (life).
Resident Engineer, Costilla Dev. Co., San Luis, Colo.
- Ward, William F., '03 (1910).
Mining Engineer, 416 E. & C. Bldg., Denver, Colo.
- Warfel, C. G., '07 (1911).
2138 Gilpin St., Denver, Colo.
- Warnecke, Carl M., '97 (life).
Assistant Electrical Engineer, Pacific Electric Ry. Co., Los Angeles, Cal.
- Washburn, Howard G., '04.
Chief Engineer, Federal Lead Co., Flat River, Mo.
- Wasley, William A., '09 (1910).
1541 12th Ave., Greeley, Colo.
Miami Copper Co., Box 100, Miami, Ariz.
- Watson, Guy P., '10 (1910).
Greeley, Colo.
Staff Quarters, McGill, Nevada.
- Watson, Hugh C., '01.
Assistant Superintendent, Ojuela Mine, Compania Minera de Penoles, Ojuela, Mapimi, Durango, Mexico.
- Wattles, William C., '03 (1911).
116 W. 13th Ave., Denver, Colo.
Engineer and Surveyor, 1204 Glendale Ave., Tropic, Calif.
- Watts, Alfred C., '02 (1911).
Chief Engineer, Utah Fuel Co., Box 919, Salt Lake City, Utah.
- Weed, Floyd, '97.
467 Emerson St., Denver, Colo.
Manager, Bailey Mine, Cobalt, Ontario, Canada.
- Weil, Jacob, '04 (1910).
Assistant Superintendent, Perth Amboy Plant, A. S. & R. Co., Maurer, N. J.
- Weinig, Arthur J., '08 (life).
1045 Main Ave., Durango, Colo.
- Weir, John A., '09 (1911).
1178 Bellaire St., Denver, Colo.
- Weiss, Andrew, '99 (life).
Project Engineer, North Platte Project, U. S. Reclamation Service, Mitchell, Neb.
- Weisz, Joseph J., '09.
2104 Humboldt Blvd., Chicago, Ill.
Metallurgical Engineer, Belgo-American Oil Syndicate.
- Wells, Benjamin T., '04.
Wells, Frank B., '03 (1911).
1110 W. 50th St., Los Angeles, Calif.
Engineer, Midas Gold Mining Co., Knob, Shasta Co., Calif.
- Wertheim, Salomonson, F. M. G. A., '89.
Deceased.
- West, John R., '10 (1910).
714 10th St., Greeley, Colo.
Placer Mining, care Jack Schade, Selma, Ore.
- Wheeler, Charles E., '94.
Wheeler, Robert M., '08.
1283 York St., Denver, Colo.
Mining Engineer, 418 Colorado Bldg., Denver, Colo.
- Whitaker, Orvil R., '98 (life).
General Superintendent, Cia Minera de Penoles, Ojuela, Mapimi, Durango, Mexico.
- White, J. L., '07 (1911).
1490 Stuart St., Denver, Colo.
- Whitehouse, Howard D., '08.
Construction Superintendent, Los Angeles Acqueduct, Brown, Calif.
- Whitehurst, J. W., '10 (1911).
Salida, Colo.
Vanadium Mines Co., Cutler, N. M.
- Wiley, Walter H., '83 (1911).
Mining Engineer, 367 S. Bonnie Brae St., Los Angeles, Cal.
- Williams, Fred T., '01.
Ontario Silver Mining Co., Park City, Utah.
- Williams, Irving B., '11.
County Surveyor, Golden, Colo.
- Williams, Wakely A., '99 (life).
Superintendent, Granby Smelter, Grand Forks, B. C., Canada.
- Wilson, Dudley M., '09 (1911).
Box 573, Oklahoma City, Okla.
- Wolf, A. G., '07 (life).
1574 Steele St., Denver, Colo.
Assayer and Chemist, Smuggler Union M. Co., Box 221, Telluride, Colo.
- Wolf, Henry J., '03 (1911).
1574 Steele St., Denver, Colo.
General Manager, Japan-Flora Mining Co., Telluride, Colo.
- Wood, Ernest B., '09 (life).
1418 Milwaukee St., Denver, Colo.
Assistant Manager and Treasurer of Cashier and Zophar M. and M. Companies.
- Woods, Thomas H., '97.
Superintendent Mill, Camp Bird, Ltd., Box F, Ouray, Colo.
- Wraith, Charles R., '11.
106 E. 7th St., Anaconda, Mont.
- Young, Frank B., '95.
Deceased.
- Zulch, Herman C., '08 (1911).
3917 W. 32d Ave., Denver, Colo.
Mining Engineer and U. S. Deputy Mineral Surveyor, Box 44, Seven Troughs, Nev.
- Zwetow, Arthur N., '11 (1911).
1230 16th St., Denver, Colo.

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If marriage is a failure, so is divorce, for
the folks who can't stay married are the
very ones who can't stay divorced.—Judge.

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No. 12

The Superficial Appearance and Alteration of Ore Deposits.

By George J. Bancroft.*

In order to approach this feature of the study of ore deposits in an intelligent manner, it is desirable to classify the outcrops in a manner entirely different from the classification given in my paper on the "Genesis of Ore Deposits." In that paper I classified them purely according to genesis. In this case the classification is more than a discussion-room convention, because the first step of an examining engineer is to settle in his own mind the class of deposits with which he is about to deal. Failure to do this simple and logical thing has led to some of the most ridiculous blunders in mining. I recall a case in Sonora that illustrates this point. There is a deposit about ten miles south of Saqui de Batuc called El Cobre Mina, which simply means The Copper Mine. This deposit consists of deposits of copper ore on the lower contact of a porphyry sill, lying in a limestone mountain. The porphyry and the limestone immediately overlying it weathered readily and hence were easily eroded. The underlying limestone was endured near the contact, the result being that the "contact" formed a bench on the mountainside. The bodies of copper ore lay in bands or shoots trending from the mountain outward. Of course, they have little depth vertically, for they are contact bodies existing only in close proximity to the sill. At the best known part of the bench, called "copper flat," the porphyry and everything above it has been eroded, leaving the shoots of copper ore exposed on the surface. They look like huge crooked veins and were so considered by a group of experienced, but not well-informed American mining men from Minas Prietas. They sank two shafts about 200 feet deep on the so considered veins, then drove a tunnel under the flat. Then they dropped the prospect as no good.

The Mexican gambocinos did not know any more about geology than the Americans, but in the course of following the ore they burrowed under the bill along the contact.

Then another group of Americans became interested and developed the mine with geological intelligence, opening up a large amount of ore, but the second bunch was, in reality, only a little more intelligent than the first, for the ore, when developed in large quantities, would not pay enough to warrant the expenditure for equipment necessary for production in such an inaccessible place.

The second lesson to be drawn from El Cobre, is, however, a side issue to the purport of this paper, as I will not attempt to go into the complexities of commercial conditions surrounding the development of mines, but shall stick to the geological side.

The first lesson to be drawn from El Cobre is that the examining engineer must first of all decide what class of ore deposit he is examining. As this question is apt to be purely a structural one, I will give a structural classification.

First—Fracture veins.

Second—Contact veins between non-eruptive rocks, i. e., stratified veins.

Third—Contact veins or ore bodies between eruptive and non-eruptive rocks.

Fourth—Impregnation deposits on porous strata.

Fifth—Impregnation deposits in crystalline rocks.

Sixth—Pipes and chimneys.

Seventh—Cement deposits.

Eighth—Deep leads.

Ninth—Stock-works.

Tenth—Mineralized dikes or batholiths of eruptive rock.

Eleventh—Segregation deposits in mineralized dikes or batholiths of eruptive rocks.

Twelfth—Cave deposits in quartzite or limestone.

Thirteenth—Fractured strata such as anticlinal and synclinal folds.

Fourteenth—Fractured eruptives, such as explosion vents, etc.

*Read at a meeting of the Colorado Scientific Society, April 21, 1911.