SPEED - ACCURATE - SAFE
Mine Signals that are dependable. Operating from lighting system.
Requires no batteries.
The Traylor Screens, as well as the conveyors, are electrically operated.
They require little care, besides having no bearings, oil or grease.

Write for our Mine Signal System folder.

THE TRAYLOR VIBRATOR CO.
Denver, Colo.

Do You Believe in Safety?
Then you believe in Stonehouse Signs—
They are standard for all industries—
They act as reminders for the old employee and give instructions to the new—Stonehouse signs are made to stand up under all conditions—Write for Catalog No. 3.

The Chrysler Building

world's highest structure . . .
how DYNAMITE helped to build this mighty skyscraper

THE Chrysler Building . . . towering above New York's amazing skyline . . . looms 1026 feet into the blue.
It is the tallest structure ever built by man.

Genius of engineering did it. But the power of dynamite was there . . . working efficiently, quickly, to blast out solid rock so that the giant foundations might be placed.

Dynamite is the ally of the modern engineer. It is the tool without which carefully designed plans for many heroic undertakings would never be more than paper plans.

Skyscrapers. Tunnels through mountains, under rivers and cities. Bridges and highways. Dams and reservoirs. These . . . and numerous other . . . engineering marvels are built with the aid of dynamite. Dynamite digs into the earth and blasts out raw materials used in the making of countless articles we use every day.

Dynamite is more than important to industry . . . it is necessary!

If you would like to learn more about explosives and how to use them . . . if you want to learn today for tomorrow's jobs . . . simply write direct to the du Pont Company for full information.

You will receive a copy of the Blasters' Handbook, which contains a great deal of the vast knowledge of explosives gained by the du Pont Company in 128 years of making and testing explosives. This book is used in the classrooms and dormitories of leading technical institutions. Your copy is free. Write for it.
Mid-summer 1896 saw sweating delegates to the Democratic National Convention in Chicago fiercely split into two camps: Gold (currency based on gold only) and Silver (Bimetallism, currency based on both silver and gold) ... The financial crisis of 1893 had forced the government to stop buying and minting silver. Thus money was growing scarce, particularly for Western and Southern farmers. They, burdened with mortgages and debts contracted during the post-Civil War boom when currency was plentiful, now demanded free and unlimited silver coinage with which to pay these debts. The Republicans waffled, declared for a gold standard until international bimetallism was possible. Eastern Democrats led by Senator Hill of New York also stood for gold. In the stifling convention hall, the debate dragged on. As TIME, had it been published July 13, 1896, would have reported subsequent events: ... Last scheduled speaker was Nebraska's young one-term congressman, William Jennings Bryan, No. 1 Orator of the Silver Democrats. His sonorous voice easily filled the hall as he sketched the history of the currency conflict, then defiantly faced the Gold delegates: "You tell us that we are about to disturb your business interests ... You have disturbed our business interests by your course ... The man who is employed ... attorney in a country town ... cattle farmer ... miner ... are as much business men as the few financial magnates who, in a lack of appreciation, corner the money of the world. We speak for this broader class of business men ... (Cheers) Our petitions ... answered ... We beg no longer. We petition no more, We defy them. (Loud applause) The holders of fixed investments have declared for the gold standard, but not ... the masses. ... There are two ideas of government: There are those who believe that if you ... make the masses do prosper, their prosperity will pass through on those below, The Democratic idea has been, however, that if you legislate to make the masses prosperous, their prosperity will find its way up through every class which rests upon them. (Cheers) You tell us that the farmers are wrong in favor of the gold standard. We reply that the great cities rest upon our farms and the grass will grow in the streets of every city in the country ... "Having behind us the producing masses of this nation and the world, we will answer their demand for a gold standard by saying to them: You shall not press down upon the brow of labor this crown of thorns; you shall not crucify mankind upon a cross of gold." A moment's silence, then a frenzied roar that announced the coming to glory of a new leader. Yelling, weeping, hundreds of delegates struggled to the platform. Eight huskies lifted Orator Bryan to their shoulders, and the parade began ... Later the Convention rejected the gold plank, adopted one demanding "free and unlimited coinage of both silver and gold at the present ratio of 16 to 1." That night a huge crowd gathered in front of Bryan's hotel, forced him to repeat his speech ... Next day another crowd rushed to the barber shop where No. 1 Orator Bryan was being shaved, to tell him that he was Democratic Candidate for U. S. President, to run on a strictly Bryan platform ... Cultivated Americans, impervious to cheap sensationalism and windy bias, turn increasingly to publications edited in the historical spirit. These publications, fair-dealing, vigorously impartial, devote themselves to the public weal in the sense that they report what they see, serve no masters, fear no groups.
Welcome Home, Miners!

Homecoming Program
1. Registration, Integral Club, Saturday morning.
2. Luncheon, Integral Club at 12:00 o'clock.
3. Parade to Field at 1:15 o'clock.
4. Special events at Brooks Field.
5. Mines vs. Teachers, 2:00 o'clock.
6. Open house and Dinner at Fraternities, following game.
7. "M" Club dance at Guggenheim Hall, 9:00 o'clock.

Saturday
October
25

When you install Reading 5-Point Pipe, you are sure that pipe maintenance costs will be practically nothing during the entire life of your building! Remember, too, that the initial cost of Reading 5-Point Pipe is only slightly higher than that of cheap, unsatisfactory pipe.

Puddling—the time-tested way of making the original, Genuine Puddled Wrought Iron—distributes this silicious element so uniformly that rust can't find a loophole. That's why it is important to insist on getting Reading Genuine Puddled Wrought Iron, known for generations. Our name and indented spiral mark protect you.

Millions of Tiny Barriers say—

RUST SHALL NOT PASS

Why doesn't rust eat into Reading Genuine Puddled Wrought Iron Pipe, as it does into ordinary pipe? A microscope will tell you—and more than eighty years of experience will furnish the proof! For, throughout the structure of Reading 5-Point Pipe, millions of silicious barriers say "Stop" to corrosion.

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READING IRON COMPANY, Reading, Pennsylvania
Atlanta • Baltimore • Cleveland • New York • Philadelphia
Boston • Cincinnati • St. Louis • Chicago • New Orleans
Buffalo • Houston • Tulsa • Seattle • San Francisco
Detroit • Pittsburgh • Los Angeles • Kansas City

For Your Protection, This Indented Spiral Forever Marks

GENUINE PUDDLED WROUGHT IRON
DIAMETERS RANGING FROM 1/8 TO 20 INCHES

Science and Invention Have Never Found a Satisfactory Substitute for Genuine Puddled Wrought Iron

When Patronizing Advertisers Please Mention Colorado School of Mines Magazine
Ol' Man River of Iron

For half a century he has been "rolling along" at the C. F. & I. Steel Works

Like a churning Amazon, white-hot metal has been flowing from C. F. & I. blast furnaces for nearly half a century.

For fifty years, this iron has been converted into steel products that have made the name "COLORADO" synonymous with quality in the minds of mining men throughout the West.

There is scarcely a mine in the western half of the country that does not use COLORADO rails, bars or structures...scarcely a mining man who does not know that The Colorado Fuel & Iron Company today is making as reliable, high quality steel as any other steel manufacturer, anywhere.

When you think of quality steel products, think of COLORADO and consult our nearest district office.

When Patronizing Advertisers Please Mention Colorado School of Mines Magazine
A Prosperous Year

THE man who is looking for the agreeable usually finds it. The opposite is also true. The opening of a new academic year manifests its problems and at the same time hopeful situations. In reviewing conditions at the Colorado School of Mines this fall there are many that which foretell a prosperous year.

We have at the present time the largest enrollment since the fall of 1924. This large number obtains in spite of the fact that more than a hundred students have been refused during the year because of deficient high school credits. The strict standard of selection at Mines indicates a sound condition. Men choosing the Colorado School of Mines do so only after consideration of the requirements for their future profession. At the same time they evaluate very carefully the reputation of the school and other conditions necessary to make an ideal choice.

With these conditions prevailing, we are confident that the School of Mines is beginning one of the most prosperous years of its history.

Contact

C'ONTACT? That shouts the airplane pilot. The propeller whirs, the engine roars, the plane moves, and he is off. The plane responded to "Contact!" Thus shouts the airplane pilot. 

Corporations and Fellowships

THE Smelter and Smelter Supply company has established a thousand dollar fellowship in metallurgy at the Colorado School of Mines. This fellowship will stimulate greater effort on the part of young men following the metallurgical option.

It should result in research which will be of vital interest to Colorado, and other mining sections throughout the world.

In our daily life we are always making contacts. Contacts with people, with men, with things, and with events.

During our school days in Golden, our main contacts were with the faculty, our fellow-students, our course of study, and with football.

In regard to kinds of human contacts, there are three: friendly, neutral, or inimical. The last is not friendly and not inimical, but may become either. The leas said about it, the better. The friendship which is not friendly should be made friendlier, and the neutral contact should be made friendly.

There are no contacts, only meetings. The mental contact is neither friendly nor inimical, but may become either. The less said about it, the better. The friendliness which is not friendly should be made friendlier, and the neutral contact should be made friendly.

Solve the Problems

THEE has been no time in the history of western mining when the problems confronting it were of greater importance. Silver is at its lowest ebb; gold is in little better shape; copper prices are below $1.00 in most places, and the market is falling; mining prospects are not so bright.

Mines' men should be aware of this situation and should take the necessary steps to overcome it. The only way to do this is by keeping close touch with all mining houses and companies, and by keeping informed of all mining developments.

The mining industry, like all other industries, is confronted with the necessity of meeting changing fundamental conditions, in order to maintain and different competition; must find new uses for its minerals; and must find ways and means to develop and utilize its great bodies of low-grade material.

$300,000 and we will get the Athletic Association on its feet and turn out a winning team yet.

Sticking to the Job

THE Summer is over. The "Vacation Spirit" is in the slow process of giving way to the "steady grind." In spite of the fact that many alumni organizations was on the job all the time.

The duties of the Alumni staff are expanding all the time. One not in close touch with this work cannot fully appreciate the importance of a well-organized Alumni Association.

Almost every man who has attended the School of Mines gets, sooner or later, some direct value from the Alumni Association. Every man who is eligible owes it to himself and to his college to join the Alumni Association.

According to the Alumni records during the past year every dollar paid into the Alumni treasury can be traced to the Alumni Association. The Alumni Association has been worth three dollars in Alumni work. This is one organization that you can support during dull times as well as prosperous times, knowing full well that your loyalty is paying big dividends to yourself and to your college associates.

Your Alumni organization is sticking to the job all the time.

-Stick to the Job-

"One for All. All for One"

THE Capability Exchange is sponsored by the Alumni. Its purpose is to provide an employment and exchange program for Mines men.

It offers two services: First, to the Mines men out of work, and second, to the Mines men who are capable of holding better positions.

The Capability Exchange is now perfecting its organization. That which is neelected most is the careful preparation of all Mines men for contact with business men. A complete record file will avail nothing, if the Exchange does not learn of openings that are in the best interests of its members. Better positions. But a complete record file will avail nothing, if the Exchange does not learn of openings in the best interests of its members. Better positions. But a complete record file will avail nothing, if the Exchange does not learn of openings.

In this, the Alumni everywhere can cooperate with the Capability Exchange by informing the Denver office of Mines men in your localities. Wire the information if necessary; it may mean a promotion for a fellow member of the Mines family.
Mines Alumni,
Throughout The World

Dear Alumnus:

The Colorado School of Mines, your Alma Mater, extends a cordial invitation to you to attend the seventh homecoming day celebration, October 25.

A prosperous year for Mines seems evident. With over 500 students registered, we have the second largest enrollment in the history of the School. We may take this as an indication of faith in the School of Mines to train engineers. Come home October 25 and see for yourself what a splendid group of young men we have on the campus.

Mines athletic teams are steadily improving. Now that the Alumni have taken an active part in assisting the athletic department in overcoming one of its greatest obstacles, the debt on Brooks Field, more rapid progress may be expected in the next year or two. The time is not far ahead when Mines will win the majority of its conference football games.

Hoping that I shall see you in Golden October 25, I remain,

Cordially yours,

M. H. Castrbaugh

MFC/PH
The C. S. M. Magazine

MINES OUT FOR REVENGE

When the Miners went to Greeley last year they took the game too lightly. Although they had the Teachers behind to tie the score. Then, as many will remember, the game was supposedly ended by the Blue Key fraternity, Mines’ booster organization. Following this will be the flag raising ceremony, just before the parade of college bands. A special event is planned, the details of which are being held as a surprise, except this special extra of the Oredigger, student weekly paper, will publish a special edition to be distributed at the field. Stories of the various players will be featured along with pictures of the team and the individual players. The line-up will be printed in large type on the front page, so that the spectators can use this paper as a program. No official program other than this special extra of the Oredigger will be distributed at the game.

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Several events will be staged before the kick-off in the game with Colorado Teachers College. First will be the annual interfraternity barse race. This has created much merriment in years past. Following the grand race will come the parade of college bands. A special event is planned, the details of which are being held as a surprise, except this special extra of the Oredigger, student weekly paper, will publish a special edition to be distributed at the field. Stories of the various players will be featured along with pictures of the team and the individual players. The line-up will be printed in large type on the front page, so that the spectators can use this paper as a program. No official program other than this special extra of the Oredigger will be distributed at the game.

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Juniors Take Short Trips

In accordance with the change in the curriculum last year, calling for the shorter trips in the senior year rather than in the junior year, the members of the junior class in the mining and metallurgical options are scheduled to take several of these trips this semester. These trips are planned for week ends, and will be excursion to plants near Golden. The long inspection trip for the mining and metallurgical options will come in the spring as usual, and only seniors will take it.

This year the trips will be three in number: September 27, Climax Molybdenum company; October 18, the Erie coal district; and the latter part of November, the Colorado Fuel and Iron works in Pueblo.

At Climax, the juniors made a study of one of the most interesting methods of mining in the world. They were shown the vast amount of work being done to develop the 12,000-foot level which includes an entirely new plant with the next to the largest haul mill in the world; crushers able to handle from 300 to 500 tons of ore per hour as compared with the present 1200 tons of ore per day, and the new flotation plant which is to begin operation soon. They also visited the old plant.

The Professors in charge of this trip made careful plans for the instruction of the men. While in class during the work previous to the trip, the men were given lectures on the peculiar method of mining, the flotation process and the geological structure of the Climax region.

The new method of grouping the students under instructors and guides at the mines gave them a better opportunity to grasp the details of the operations at Climax.

The men were grouped under Prof. J. Burns Read and M. I. Signer; the metallurgical students under Prof. Irving A. Palmer and W. B. Jacobson. Some of the Senior Geologists and Metallurgists were grouped under Prof. W. P. Huleatt.

Eighty students and professors made the trip.

NEW CRUSHING PLANT

A new crushing plant and additional development work are the new features of the mine and mill which were observed by the inspection group. The details description of this work which follows is taken from the E. and M. J.

of recent date: "Construction of the new crushing plant has been practically completed. The 750-ton capacity coarse ore bin is finished, and the 60-48-inch, all-steel Buchanan jaw crusher has been erected and is ready to run. Both the 7½ and 5½-ft. Symons cone crushers have been installed, and the 108-inch rotary barrel at the plant will be ready for operation by Oct. 1. It will reduce ore passing through 30-inch gratings to a 3-inch mill feed, and is expected to have a capacity of 2,500 tons per shift.

Phillipson tunnel, which is being driven 450 ft. below the old workings, is scheduled to be completed by the time the crushing plant is in operation. The plant will be ready for operation by Oct. 1. It will reduce ore passing through 30-inch gratings to a 3-inch mill feed, and is expected to have a capacity of 2,500 tons per shift.

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Frank Reinhard Passes On

Frank Reinhard, member of the class of 1905, died October 6 in a Denver hospital. Death followed an operation for appendicitis. His condition was reported favorable Sunday, and he was expected to recover. The sudden change for the worse resulting in his death Monday night was unexpected.

Reinhard was prominent in Colorado business circles. He was associated with the Equitable Life Insurance Company, and at times held offices both in Golden and Denver. He had been active for many years in Alumna and School affairs. His interest in Mines athletics was manifested in the many little services rendered to the coaches and the department of physical education at the school.

John Has Served for 50 Years

This month John A. Atkinson completed his thirtieth year with the Colorado School of Mines. John is very proud that he is the oldest man employed by the school and is more active at 70 than many young men.

John came to this country from Sweden when he was eight years old and arrived in Ralston creek in 1869. His father moved to Golden and built a house at Eleventh and Illinois streets in 1872. John has lived in this house practically ever since. Because of poor health he did not go to school until he was eleven years old. Then he stayed only a short time because he had to work. He did however learn the English language during his short time in school.

In September 1899 John applied for a job with the School of Mines. He was put to work in the assay laboratory which was then in the southwest corner of the present Chemistry laboratory. Later he became general superintendent of properties operated by this same company.

Hickok is a member of Beta Theta Pi, Sigma Gamma Epsilon and Tau Beta Pi. While attending Mines he participated in tennis, track and golf.

Frank Reinhard, 1905

Anomalies of Vertical Intensity

Chapter II

The C. S. M. Magazine

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Anomalies of Vertical Intensity

Chapter II

The northeastern part of Alabama is mountainous while the southern and western parts belong to the Gulf Coastal Plain. The former area consists chiefly of rocks of Pre-Cambrian and Paleozoic age. The formations of the latter range from Cretaceous to Recent.

Considering first the mountainous area of the northeast, it can be said that the Pre-Cambrian portion in the east is chiefly "low" with a high area in the eastern part. An examination of the geologic map shows that these areas represent different types of rocks but it is quite possible that the "low" part can be accounted for by considering the stations to be in valleys in the mountain area. In "low" areas it is quite probable that sedimentary beds, although they consist of brown iron, it is to be noted that in many instances in adjoining areas the Paleozoic areas also appear as "highs" which indicate the Colorado type of sedimentary effects, but which may be due to the type of rock or proximity of the basement.

Consideration of the "high" area connected by isoniclinal lines to the "low" of western New Mexico. According to Mr. Wilson, the large "low" area in central and northern New Mexico may be due to shortage of stations, errors from interpolating between such distant stations, or to the fact that exact outlines of these nuclear land masses are not known.

When the geologic map of the area was published, it was thought that there was a "low" in the northeastern part of the state, and a "high" in the southeastern part also seems to represent a granitic area. In the northeastern part there is a "low" which has been connected with the magnetic "highs" of New Mexico. The stations here were taken in granitic mountainous areas which accounts for the "low" as described in Chapter II. Whether these masses actually tie up with the "high" extends throughout the southeastern part of the state.

The Colorado Plain Region here therefore, as in adjoining states, is of the Florida type and appears favorable for magnetic prospecting. This is well brought out by the increase in "low" areas toward the south indicates dip in that direction.

The C. S. M. Magazine

The C. S. M. Magazine

Arizona

Chapter II

The "low" in the center of the large "low" area.

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The C. S. M. Magazine for October, 1938

The regional anomalies of Arkansas are not in general so easily explained as those of many other states. Topo­graphically they consist of four distinct divisions of nearly equal size. The northwest is mountainous and comprises the Ozark upland in the north, the Ouachita mountains in the south, and between these two is the Arkansas Valley. Most of the rocks in this region are sedimentaries of all ages. In a few small areas igneous rocks, at most covering fifteen square miles in the central part of the state. The southeast part belongs to the Gulf Coastal Plain, the exposed rocks here being Cenozoic and Tertiary in age.

In the northwestern part a magnetic "high" is found in the area occupied by the Ozark plateau. Two "highs" in this region, which extends from western Tennessee into Missouri, will be discussed separately. The area where there are no indications, however, that the magnetic information from this source is too much to be of use in the location of local structures.

California

The correlation of the magnetic anomalies with the regional geology in this state has been discussed by the writer in previous articles. Since that time considerable new material has come to light that will be discussed separately. These are:

1. The Coast Range "high" to the west.
2. The California Valley "low".
3. The Sierra Nevada "low".
4. Southern California, including both the moun­tainous region along the coast and the desert, or basin and range country.

Attention is called to the following minor errors in the instalment of this series.
The word "Positive" in line 21, left column, page 9, should read "Negative".
The word "sound" in line 6, left column, page 11, should read "sounded".
The word "hundreds" in the seventh line from bottom, left column, page 12, should read "hundred".
The second sentence of the next to last paragraph, right column, page 11, should read: "First, the normal value of the vertical intensity . . . etc."
The word "position" in thirteenth line from bottom of left column, page 12, should read "pass".

The "Coast Range" "high", as a line of magnetic "lows".
(1) the Coast Range "high" to the west.
(2) The California Valley "low".
(3) The Sierra Nevada "low".
(4) Southern California, including both the mountainous region along the coast and the desert, or basin and range country.

When the mountainous area of this state was considered together with the relatively few stations available it was thought at first that little could be accomplished in the way of correlation. It was found, however, that practically every anomaly could be explained, and in such a way that the writer in the work on other states, were solved here. Magnetometer work carried out by Jaradav A. Malovisky, Instructor in Geophysics at the Colorado School of Mines, in the eastern part of the state indicated at first that the results obtained from United States Coast Survey geophysical data might be of little value in correlation with regional structure. However, a close comparison of the two sets of results, together with additional field work near the mountains, solved the problem with the result that this state is considered as one of the key states upon which this thesis is based.

It can be readily seen, however, from the above data, that the geological information from this source is too much to be of use in the location of local structures.

"Erratta"

The word "position" in thirteenth line from bottom of left column, page 12, should read "pass".

The "Coast Range" "high", as a line of magnetic "lows".
(1) the Coast Range "high" to the west.
(2) The California Valley "low".
(3) The Sierra Nevada "low".
(4) Southern California, including both the mountainous region along the coast and the desert, or basin and range country.
In the northwestern corner is a "low" which extends into Utah and marks the Uinta Mountain uplift. Between that and the "high" in the northeast central "low" is a "high" which extends into Utah. This is drawn from only five stations located within 150 miles, but accurate plots have been covered in a plateau of Mesozoic and Tertiary formations, some of which are volcanic. The "high" is apparently due to the positive area against the five positive areas mentioned above. They are apparently due to local structure at those particular stations. There was no apparent "high" in the central part of the state. The Sangre de Cristo mountains in southwestern Colorado is shown by a series of "highs" and "lows." This is accounted for by the positive area against the five "highs" in the central part of the state.

The San Juan country in southwestern Colorado is differentiated Pre-Cambrian gneisses. The western zone consists of unidentified Pre-Cambrian gneisses, Paleozoic sediments from Cambrian to Mississippian. The eastern zone contains the Newark group of continental deposits.

The San Juan country in southwestern Colorado is a strong magnetic "high" which is probably due to the basement rock since a plentiful water supply is found within three hundred feet of the surface. The conditions indicated by the so-called geologists who take credit for locating such wells have been drilled here but none are reported as reaching the basement rock since a plentiful water supply is found within three hundred feet of the surface. The conditions indicated by the so-called geologists who take credit for locating such wells have been drilled here but none are reported as reaching the basement rock since a plentiful water supply is found within three hundred feet of the surface. The conditions indicated by the so-called geologists who take credit for locating such wells have been drilled here but none are reported as reaching the basement rock since a plentiful water supply is found within three hundred feet of the surface. 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The conditions indicated by the so-called geologists who take credit for locating such wells have been drilled here but none are reported as reaching the basement rock since a plentiful water supply is found within three hundred feet of the surface.
Cost of Magnetometer Surveying

By DART WANDLAND*

The following report was prepared on the cost of magnetometer surveying as done in geophysics 401 at the Colorado School of Mines. This report was submitted September 18, 1930, and received the highest grade. Those making the report are M. A. Tiberius, F. S. Wieher, and George Welch. (By way of explanation, geophysics 401 is the course "Review of Geophysical Methods").

The report follows:

Factors to Be Considered
Weather, personal, topography, transportation, location in respect to section corners, lost time, depreciation of car and instrument, and salary.

Of these factors the personal factor is by far the most important one in a discussion of real cost; that is, cost measured in quality of work done.

The following data were furnished by a reputable oil company as a favor to the committee making this report. It is accurate within 5 per cent.

Cost of magnetometer surveying in searching for petroleum.

Case Number 1:
Location......California
Time of Survey...3 months
Area covered...10,000 square miles
Number of stations...1500
Expenses:
Car...
Car depreciation...
Instrument depreciation...
Personal expenses...
Salary...
Miscellaneous...
Total cost...
Cost per station...
Cost per day...
Cost per month...
Cost per year...

Case Number 2:
Location......Western Canada
Time of Survey......2 months
Area covered...7200 square miles
Number of stations...150
Expenses:
Car...
Car depreciation...
Instrument depreciation...
Personal expenses...
Salary...
Miscellaneous...
Total cost...
Cost per station...
Cost per day...
Cost per month...
Cost per year...

Case Number 3:
Location......Southwestern Texas
Time of survey......15 days
Number of stations...200
Expenses:
Personal...
Salary...
Auto...
Auto depreciation...
Instrument depreciation...
Total cost...
Cost per station...
Cost per day...
Cost per month...

Case Number 4:
Location......Texas (Panhandle)
Number of stations...1200
Area...7200 square miles
Time of survey......3 months
Expenses:
Personal...
Salary...
Auto...
Auto depreciation...
Salary...
Miscellaneous...
Total cost...
Cost per station...
Cost per day...
Cost per month...

*Associate Professor of Metallurgy, Colorado School of Mines.

As noted some time before, there is no such thing in practice as an absolutely selective solvent. In the hydro-metallurgical process, treatment should be aimed toward concentrating, therefore, the solution coming from the leaching and separation divisions invariably contains one or more impurities which would not be removed even by the most perfect recovery of the main metal.

In general, such impurities may be in true solution or in suspension, as colloids or non-colloids. In either event, they must be removed; the solution going to the metal precipitation step should be as pure as possible, and as economically as possible. The problem of purification of leach solutions involves, then, not only the elimination of impurities by chemical means, but also by physical means, as by filtration. In dealing with metals, as with plants and animals, it is well to remember that the product is no better than the parent stock, and usually is much worse.

From the considerations developed in the chapter on leaching, and with particular reference to the copper group of the elements, it is apparent that the lower (more noble) the metal in the series, the fewer the elements that can precipitate it from solution. This is just another way of saying that it is easier to get pure gold than copper from solution; and by deduction, lower copper precipitation is relatively simple as compared to zinc precipitation.

The simplest case of purification, then, is that of metal replacement. For example, a neutral zinc solution contains copper and zinc; it is impossible to deposit zinc from solution in the presence of even very small amounts of these metals; hence it is common practice to use the impure zinc solution with an excess of zinc dust to replace the impure copper solution with an excess of zinc dust to replace the...
creases. And if this is true for copper, how much greater must it be for a case of a metal like Cd? The answer, in the quixant parlance of the day, is, "and how!"

These considerations also show, in at least a qualitative way, why some metals, and other impurities, cannot be removed by liquid-solid separation, but must be recovered by other means altogether. That ubiquitous element, iron, is particularly troublesome; there are also other polyvalent, amphoteric elements which can exist either as anions or cations, depending upon the pH of the solution. The removal of these "diplomats" may be effected in several ways. Each case is more or less of a law unto itself; but a few examples will be given.

In the extraction of copper from low-grade oxide ores, dilute sulfuric acid is the common solvent; but in some of the ores there are native chlorides which get into solution. The presence of Cl\(^-\) ion causes rapid deterioration of the insoluble anode and leads to formation of Cl\(^-\) complexes. To keep the Cl\(^-\) concentration at a minimum, the leach solutions are treated with cement copper; this leads to the formation of CuCl\(^2\) which is insoluble, and may be separated along with the excess Cu.

Thus, problems troubles in the electrolysis of copper ores. Ferric sulfate is formed at the insoluble anodes, and reacts with the metallic Cu at the cathode—

\[ \text{Cu} + \text{Fe}_2\text{SO}_4 = \text{CuSO}_4 + \text{Fe} \]

which leads to low cathode efficiency and high power cost. The electrolyte is not just for ionic conductivity, but for its solution capacity at periodic intervals to keep the iron in the reduced state.

Cobalt and nickel are particularly detrimental to the deposition of pure copper. Each of these has been found necessary to limit the concentrations of these elements by means of an unhke, immiscible phase in contact with that of the liquid. The presence of such a phase renders all of the Cd water-soluble, but breaks down hard and fast rules for their employment, since each is the absolute viscosity of the liquid, \( \eta \), the linear thickness, \( h \), the tube, \( D \), the absolute pressure, \( P \), and the area, \( A \), is given by:

\[ dV \approx \frac{4}{3} h \eta D^2 P A \]

Adhesively means condensation or local concentration at a surface or interface between two unlike phases. As mentioned before, every free surface of a liquid or solid exists, or is possess of, a "stray field of force". Now one manifestation of this field is its ability to attract and hold at the surface from which it sets one or more of the constituents of an unlike, immiscible phase in contact with that surface. Thus, a solution can be treated with a solid, and the constituents of the liquid are adsorbed (by condensation) upon the solid. This phenomenon is perfectly general, and the effects are highly specific: a given solid usually has a selective adsorption for the constituents of a given liquid; and the adsorption of gases by liquids and solids is even more noticeably specific.

The exact nature and reason d'etre of and for adsorption are not at all well understood; but this much is certain: that adsorption is a surface effect; and as such, the adsorptive capacity of a given solid must necessarily be a function of the surface area of that solid. But while it is unanswerable at the present time, the surface of a solid, at constant temperature, we may utilize the following relation as a first approximation:

\[ (m/x) = kc \]

where \( m \) is the amount adsorbed by \( x \) units of the solid adsorbing agent, \( c \) is the concentration of the solution, and \( k \) is a constant. This is known as the "adsorption isotherm", or sometimes as "Blitz's Equation".

In some cases, changes in surface tension, as a result of adsorption, may be utilized; but it is impossible to lay down hard and fast rules for their employment, since each case must necessarily be considered individually. As a general guide or first approximation, since, especially in the dissolved state, the "solution pressure" of the solid also plays an important role.

The solution pressure of a solid is the tendency of the solid to migrate to the surface of a liquid. If the solid is more soluble in dilute sulfuric acid than in water, it is good practice to supply a stable excess of adsorbing agent.

In certain special cases, chemical and physico-chemical methods other than those mentioned may be employed. These methods include: elementary, heat of mixing, hydrolysis, etc., etc., may be utilized; but it is impossible to lay down hard and fast rules for their employment, since each case must necessarily be considered individually.

For instance, it often happens that such perrniscous and persistent elements as arsenic and antimony get into the copper. These elements, being anionic and of acid nature, are necessarily impurities to ordinary means of chemical extraction. But, like all things animate and inanimate, they have their adhesively, or rather adsorbed, by certain insoluble metal hydroxides, notably ferric hydroxide and nickel hydroxide.

Such reactions mean condensation or local concentration at a surface or interface between two unlike phases. As mentioned before, every free surface of a liquid or solid exists, or is possessed of, a "stray field of force". Now one manifestation of this field is its ability to attract and hold at the surface from which it sets one or more of the constituents of an unlike, immiscible phase in contact with that surface. Thus, a solution can be treated with a solid, and the constituents of the liquid are adsorbed (by condensation) upon the solid. This phenomenon is perfectly general, and the effects are highly specific: a given solid usually has a selective adsorption for the constituents of a given liquid; and the adsorption of gases by liquids and solids is even more noticeably specific.

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pressure in batch filters under positive pressure. Thus, a
ployed.

greater than one atmosphere, the cake compression quickly
creases over one atmosphere. Hence, for rotary filters
comes an appreciable factor, then we must introduce a term
which is entirely satisfactory for dealing with non-com­
kakes, we must assume that the specific resistance of the
end of the run the pressure may go up to 50 or 60 lbs.
presses, and in these tj'pe$ the pressure changes as the cake
builds up. This follows from the fact that it is better

to employ pressure filters, such as the Kelly or Burt filter

The pulps resulting from most hydrometallurgical separa­
tion must be retarded by decreased temperature.

since viscosity decreases with increase in temperature, filtra­

tion must be the cake in any kind of filtration. Moisture con­

the solids, and the higher their colloid content, the thinner

must be the cake in any kind of filtration. Moisture con­
tent of good filter cake varies usually between 5 and 20 per

cents, depending upon the fineness of the solids.

In conclusion, the choice of a filter for a given job can
usually be made from analogous experience at other plants
or from similar work. The value of the equations developed
above lies largely in apparatus of different efficiency,
and as to probable gains by use of different schedules of
washing, different media, etc.

Mineral Production in 1929

The value of the mineral products of the Nation in 1929
was $5,600,000,000, or 8 per cent greater than the value
of the 1928 mineral output, according to the Bureau of
Minerals. The upward trend was, however, neither general
uniform and did not bring the total to preceding high
levels of the last decade—$6,235,000,000 in 1920, a year
of marked prosperity, and $5,986,500,000 in 1923 and
$6,091,340,000 in 1922. As in all such comparisons, the
value of all nonmetallic products, except fuels, was low
this year. The value of fuel products for the first year of the
decade except the first three; and that the value of all
mineral fuels in 1929 surpassed that for each year of the
decade except 1926, 1927, and 1928.

"It's a fine day, miss.

"It's a fine day, all right; but I'm not a 'miss,' I'm a
'mister.'"

"Ah, I beg your pardon. You looked so much like a
took you for a girl."—Miles, Shoe-U-Mah.

S. M. SOUPCOFF, '10

S. M. Soupcoff, '10, succumbed to a sudden heart attack
on the night of September 19. The news of his death came
to the Alumni office as a sudden shock, as he had
been in excellent health until the time of his demise.
According to communications received from his friends,
Soupcoff returned home from his office early on the
nineteenth, complaining of a slight "heart-burn"; he ate a
light meal and retired early. In the morning, since he did
not arrive at the usual time, he was sent for. There was
no response to the knocks at his door, and it was found
that he had died during the night. An autopsy revealed
that death had resulted from heart failure.

Soupcoff was graduated from the Colorado School
of Mines in 1910. Following his graduation he took a
position with the Anaconda Copper Mining company.
This was the beginning of a successful career in mining
engineering. His second position was with John B. Farish
as a consulting engineer and his work here carried him
into the Hudson bay country, Alaska, South America
and many other countries in the western hemisphere.
In 1913 he became affiliated with the Guggenheim
interests and was with that organization for 14 years.
At the time of his death Soupcoff was associated with
the Monte, Leonard and Lynch company, New York in
vestigation bankers and brokers.

Mr. Soupcoff was widely known in the west as an ex­
pert advisor on mining problems and for his activities in
Minneapolis and other cities. He resided in Salt Lake
until August 1930, when he moved to New York.
He is survived by his widow and son, Tom.

Martinez KILLED IN DUEL

News of the death of Jacob Martinez following a duel
with a Mexican army officer, September 13, was received
by the Alumni at the School on the evening of the same day.
Martinez was an ex-Mines man.

According to the information received, Martinez entered
into a heated argument with an army officer and in the
resulting the officer slapped his face. Martinez being of
the hot-blooded Spanish type and holding honor dearer than
life itself, retaliated by challenging him to a duel. In

saying so, he, of course, allowed the officer the choice of
weapons. The decision was a duel with pistols.
The combat took place that same evening in a remote
spot, near the city of Victoria, Mexico, and resulted in the
challenger being mortally wounded. He was immediately
removed to a hospital in a very critical condition where he
died three days later.

Martinez received his education in the United States.
He attended high school at the Western Military Academy
of Indiana, from which he was graduated in 1927. He
then entered Purdue University where he remained for
one year. In the fall of 1928, Martinez entered the Colorado
School of Mines and remained as a student here for the
ensuing school year.

FORMER TRUSTEE DIES

Joseph S. Jaffa died in the Presbyterian hospital, Den­
von, May 28, 1930, at the age of eighty. Mr. Jaffa was
stricken while attending a dinner at the Green Gables
country club, and lived only a few hours after being re­
moved to the hospital.

Mr. Jaffa was a former trustee of the Colorado School
of Mines. He served in this capacity for eight years, from
1903 until 1911. He had taught mining law at the School
for over twenty years.

JACOPO M. MARTINEZ

the first associate membership in the Alumni Associa­
tion was granted to Mr. Jaffa. His application for such
membership was the first received following the amendment
to the constitution providing for associate members.

Mr. Jaffa was born in Philadelphia and attended schools
there. He was a graduate of the University of Pennsyl­
vania and the Columbia law school.

He is survived by his wife, Mrs. Abina Jaffa and three
sisters.
Fourth Annual Field Conference of Kansas Geological Society

By Neil W. Hills, '26, and Ronald K. Deford, '21

The Fourth Annual Field Conference of the Kansas Geological Society was held at Denver, Colorado, starting from Colorado Springs, Colorado, and ending at Albuquerque, New Mexico. Over one hundred and twenty men (also two ladies) made the trip in about forty-five cars.

The itinerary of the trip is as follows:

Sunday, August 31. Arrive at Colorado Springs for registration.

Monday, September 1. Visit to Puye ruins.

Tuesday, September 2. Visit to Santa Clara Indian Pueblo.

Wednesday, September 3. Study of sections from granite to Dakota in vicinity of Colorado Springs. A study of similar sections in vicinity of Canon City (including the Colorado School of Mines). Lunch at Canon City (Strathmore Hotel). Visit to Florence and Canon City oil fields.


Saturday, September 6. Study of Cretaceous thrusts and their relationship to the Ancil Rockies. The field work for this part of the trip (in Colorado) is being conducted by Fred Johnson for the U. S. G. S. He gave a preliminary report at Pueblo on the Permian-Pennsylvanian beds and their relationship to the Ancil Rockies.

The trip was a huge success, although a long and hard one. The Colorado School of Mines contributed their share of the men present on the trip. The following men were the leaders of the group:

Ronald K. Deford of Kansas Geological Society

The Fourth Annual Field Conference of the Kansas Geological Society is a compilation of geological data on the area covered by the trip. Certain contributions to this book were made by Miss Mary Stuart and R. P. Milne of the Kansas Geological Survey.

GEOLOGY DIARY.


Tuesday, September 2. "Study of Recent Lake Beds in Southern End of the Estancia Valley." By Bernard Parker, '24, Donald Berth, '24, and others.


Friday, September 5. "Study of Recent Lake Beds in Southern End of the Estancia Valley." By Bernard Parker, '24, Donald Berth, '24, and others.


Interplanetary Spacecraft. Due to the very nature of the season and the inability of all of the participants to arrange their vacations, the Alpha Tau Omegas still must play the Sigma Phi Epsilons in this joust in space. The winner of the Alpha Tau Omegas will meet the Alpha Epsilons for the championship. The results of this competition were most interesting.

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For this purpose on the lawn at the rear of Guggenheim Hall.

PETROLEUM PRODUCTION.

Denver-Waltons Regis

After holding Denver University season to be the most successful, Regis college was given a 60-0 defeat Saturday night, representing the Oklahoma State University.

An estimated crowd of 17,000 people witnessed this first night game of the season.

With the score ending 6-0 at the end of the first quarter, the players came back with a hard, fighting offense. O. U. dominated the game from start to finish, and a final score of 16-0 was recorded. The Waltons Regis were the outstanding players.
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Telling the News of Golden and the School of Mines
SINCE 1866

September's share of visitors at Mines was great as ever. Dr. Robert Landen, 
father of the U. S. S. Gold, was here in October. He visited Colorado, exploring the possibility of its area for further work with this group. Among Mines guests was Dr. O. C. D. Lingsward, founder of the geology de-
velopment of the School of Mines who has been working around Alms, Colorado, during the summer. He spent several days in Golden before returning to his position at the University of California. New York. Dr. C. R. Blythe, professor of economics at the University of Cal-
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All-in-all hear you had a fine time at your recent meeting in Golden. PIke-Sb, sh! It's this Tuesday night.

United Verde Copper Co.
Mines at Jerome, Arizona
Sweller and Concentrator
Clarkdale, Arizona

Olini Molybdenum Co.
Climax, Colo.

Institution during the summer on Pike's Peak. Another Mines guest was Dr. Q. D. Weller, working around Alma, Colorado, during September 15, and intended returning later for further work with this group. Among Mines guests was Dr. O. C. D. Lingsward, founder of the geology development of the School of Mines who has been working around Alms, Colorado, during the summer. He spent several days in Golden before returning to his position at the University of California. New York. Dr. C. R. Blythe, professor of economics at the University of Cal-
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Southern California Section

The Southern California Section of the Alumni Association met at the University Club for dinner, Westchester September 24. The meeting was in order with the attendance of the members present. Following the dinner the program was announced and accepted, and the speaker of the evening was Mr. Allen Tupper. Mr. Tupper is the Chief of the Department of Mines at the University of California. He has been in this country since 1928, and has worked as an engineer on several important projects. His talk was very interesting and full of useful information. The meeting ended with a vote of thanks to Mr. Tupper and a successful end to the Southern California Section meeting.

Monteerry Section

The Monteerry Section is at work now in the preparation of our next meeting. We have a great many good ideas and plans for the future. We hope to have a big meeting and to attract a large number of members. We are making good progress and hope to have a successful meeting in the near future.

Alumni Letters

Sprains and Bruises

By CHARLES WHALEY

The November issue of the Alumni Magazine was very interesting and full of useful information. The Editor's note, "A contributor to the Alumni Magazine thinks I can improve the present situation in this magazine. I think it would be better if there was less emphasis on the alumni in the magazine. Instead, I would like to see more articles about the students and their activities."

I just received your letter and the Magazine of April, May and June. I enjoyed it very much. I think the alumni should have more input into the magazine. I would like to see more articles about the alumni and their activities.

Do you have any comment to make upon this magazine? I think the alumni should have more input into the magazine.

Best regards,

Byron M. Johnson, '08.

EDITOR’S NOTE—A contributor to the Alumni Magazine thinks I can improve the present situation in this magazine. I think it would be better if there was less emphasis on the alumni in the magazine. Instead, I would like to see more articles about the students and their activities."

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Back to the October, 1930 issue:

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Do you have any comment to make upon this magazine? I think the alumni should have more input into the magazine.

Best regards,

Byron M. Johnson, '08.
Avenue, Fullerton, Calif.

Bartlesville, Okla.

eeer for Norroe & Tower, New York

as, S. L. P., Mexico.

the San Bernardino Junior College, Col-

America last month after a vacation of

to their Seattle office, 701 Hoge Building.

mailing address is 67S So. Coronado

Compania Minera Choco Pacifico at

posta 315, Loanda, Angola, Portuguese

Worth, Texas, the middle of September

in Texas. Purdum is with the Oil Well

Purdum is on a round-the-world tour

and Denver while vacationing

in El Paso. He is employed by the

Mr. and Mrs. L. H. Stephens of Golden,

Gartrell is on a round-the-world tour

Refining company (Ind.) has his mailing address

from Mines in 1928, and is employed as
Homecoming Day October 25

Other features will be a history of Mines football in the early days; a review of the previous encounters with the comparatively young Teachers' College team; a short history of Brooks Field; plans for expanding athletics at Mines, and others.

Turn to the announcement page in the front of this Magazine for the program of homecoming day.

Chief Petroleum Economist

The appointment of E. B. Swanson as Chief Economist of the Division of Petroleum Economics of the United States Bureau of Mines, is announced by Scott Turner, Director of the Bureau. Mr. Swanson has been serving as acting chief of the division since October, 1928. He is a graduate of the University of Washington and did graduate work in economics at the Robert Brookings Graduate School in Washington, D. C. Other recent personnel changes in the Petroleum Economics Division of the Bureau include the promotion of G. R. Hopkins from Associate Petroleum Economist to Economic Analyst and of A. H. Redfield from Assistant Scientist to Associate Economic Analyst. The Petroleum Economics Division was established as a unit in the Economics Branch of the Bureau of Mines on January 1, 1926, at which time H. H. Hill, chief engineer of the Petroleum and natural Gas Division of the Technologic Branch, was designated to serve as Chief of the Petroleum Economics Division during its formative period. Future work of the Petroleum Economics Division will include additional studies of the distribution and utilization of petroleum products, according to C. F. White, chief of the Economics Branch of the Bureau. He will also be responsible for the appointment of additional personnel to conduct these new studies is anticipated. Mr. White stated that a number of problems related to distribution and utilization are under consideration and that final selection and appointment of additional personnel may be expected within a short time.
A Class by Itself

The mining engineer who was graduated 37 years ago had his diploma framed the same year we started making Card Mine Cars.

Mining men from Cobalt to Somora can give plenty of reasons for standardizing on Card haulage equipment, but they'll tell you one reason is sufficient—

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C.S. Card Iron Works
Denver

Artice C. Damar, '15
Frank E. Baker, '16

DuPont Releases Films

Announcement is made by E. I. du Pont de Nemours & Company of the release of the fourth of their series of motion picture films produced for exhibition before the engineers and engineering students of the country. The new film is entitled "Blasting the Water Highways of America" and shows the work being done in New York Harbor and the Great Lakes to keep the waters safe for navigation.

The current release adds a picture of submarine work to the library and should be of interest because of the unusual problems which are encountered. Animated graphics are used to make clear what is going on under the surface of the water, while actual photographs depict the drill boats at work, the loading of the explosives into stove pipes, for lowering into the water; the actual "shot", the dredges lifting the broken material from the river bed to the waiting scows, and the methods used in determining the correct depth of the channels. An interesting feature also is the maintenance of water storage for the dynamite and its delivery to boats in operation.

This film is one reel in length, requires fifteen minutes for showing and is available in either standard or amateur size film. This subject as well as any of the others mentioned above will be loaned, free of charge, to any interested party upon application to the Motion Picture Bureau of E. I. du Pont de Nemours & Company, Inc., at Wilmington, Delaware.

Brimonious to Anthracite

A new process whereby bituminous coal can be converted into a high-grade anthracite coal on a commercial basis has been invented by Clarence S. Lomax according to press reports. A plant for the conversion process was opened August 16 in Chicago.

The new process was developed after eight years' experimentation, and it is said to duplicate in a few hours the work of millions of years by Nature. Low temperatures carbonization is the secret.

The factory manufacturing the product has a capacity of 600 tons a day. The bituminous material has a volatility of thirty per cent, but the new process reduces the volatility to twelve per cent.

Lomax is the inventor of the coke oven and numerous other chemical inventions.

U. S. Civil Service Examination

The United States Civil Service Commission announces the following-named open competitive examination:

METALLURGIST

Applications for metallurgist must be on file with the U. S. Civil Service Commission at Washington, D. C., not later than October 29, 1930.

The entrance salary is $3,800 a year.

This examination is to fill vacancies in the Departmental Service, Washington, D. C., and in the Federally classified service throughout the United States.

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Frederick R. Hudson, '03
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T. D. Banfowsky, '09
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Salida, Colorado

Carlyle A. Blake, '16
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Mining Engineers
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A. E. Craig, '14
Metallurgical Engineer
The Mine & Smelter Supply Co.
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Frank C. Bowman, '01
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Denver, Colorado

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Mining Engineer
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Donald Dyensfort, '12
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Cory and Morris
Arthur V. Corey, '98

E. E. Blumenthal '98
Phillipsburg, Mont.

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Harvey Mathews, '13
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Stearns-Roger Manufacturing Co.
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C. A. Johnson Bldg., Denver, Colo.

H. C. Kuss, '10
District Manager
Copper Co. of America
4315 Walnut Street
Denver, Colo.

Warren Prosser
District Manager
Federated Metals Corporation

Charles M. Rath, '05
Petroleum Geologist and Appraiser
Midwest Refining Co.
Denver, Colo.

Consulting Engineers
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John Edward Norman, '98
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Denver, Colo.

Alfred E. Perkins, '10
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C. H. Northrup, '03
Sales Engineer
Denver, Colorado

L. B. Williams, '11
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The vision and skill of college-trained men are largely responsible for the continuing leadership of General Electric in its service of furnishing machines and devices that provide the swift, sure convenience and the economy of electricity — on land and sea and in the air. 
Pyrometers and Temperature Regulators are only two among dozens of Tycos Instruments ideally suited for use in the Mining Industry. Wherever there is Temperature, Pressure, Vacuum or Humidity, Tycos Instruments will aid production by indicating, recording, or controlling them accurately.

As agents of the Taylor Instrument Companies and the Tycos line, we handle so many of these well-known products that it is impossible to list them all here. They range from Pyro Radiation Pyrometers to measure the highest temperatures, to Surveying Barometers, Recording Barometers, and Anemometers which gauge tunnel wind velocity.

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