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Designed to use either oil or gas fuel, these furnaces economically produce high and uniform temperatures.

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HUDSON TERMINAL BUILDING
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The Colorado School of Mines Magazine
Vol. 1. GOLDEN, COLO., MARCH, 1911.
No. 6

Lower Yellowstone Irrigation Project, Montana.
Robert S. Stockton, '95, Resident Engineer in Charge.
Gilbert L. Davis, '99, Construction Engineer.

Location and Source of Water Supply.
The Lower Yellowstone project, as its name suggests, is situated near the mouth of the Yellowstone River, in Northeastern Montana and Western North Dakota. The project involves a strip of land extending 61 miles along the west bank of the Yellowstone River and about five miles broad at its widest point.

Water for the irrigation of this land is diverted from the river at a point fourteen miles northeast of Glendive, Mont. A low diversion dam, 12 feet high and 700 feet long, of stone and timber, is so located that the water can be taken from the river through eleven 5-foot gates in a massive concrete structure. From the headgates the canal runs for several miles through a deep cut and is protected by a bank or dike from overflow due to ice gorges. For the first nineteen miles the canal covers only a few thousand acres of land, but beyond this point the valley is wider and a tract of 7,000 acres of fine land affords an opportunity to drop the water for its irrigation through a turbine water-wheel operating a centrifugal pump and supplying water to about 3,000 acres of fine land on the Tokoa bench. Thirty-six miles below the head-works the canal crosses Fox Creek in a double-barrelled concrete arch 225 feet long. Below this point there is but little difficult construction and the valley widens. Most of the heavy work in the canal is in the first thirty-six miles and includes deep cuts and concrete flumes and culverts for passing storm water over or under the canal.

The Yellowstone River affords an ample water supply, as the low waterflow past the head-works of the Lower Yellowstone Canal is several times the maximum amount required for irrigation of the project lands.

Items of Historical Interest.
In the settlement of nearly all of our country, trappers and traders have been the pathfinders for civilization. They were the first to penetrate Montana, but it was many years after Lewis and Clark had explored the territory and given a new impulse to the fur trade before much was accomplished in the settlement of this region. In 1830 the American Fur Company, of which John Jacob Astor was the founder, established Fort Union at the junction of the Missouri and Yellowstone Rivers, and sent the first steamboat to that point. This post, at the gateway to Montana, holds a conspicuous place in the early history of the State.

About 1860 the discovery of gold called thousands of prospectors into the country, and these men were followed later by miners, bringing their families and establishing their homes in the rich valleys. But the Indians fiercely guarded their hunting grounds along the Yellowstone and so the tide of immigration passed on to the west. Only thirty years ago one could stand on a peak overlooking the Yellowstone Valley and see a herd of 25,000 buffalo grazing where today broad fields of grain extend for miles. Trains were sometimes halted for hours while the buffalo went down to the Yellowstone to drink, and in the fall, when the buffalo left for their winter pastures, the stockmen's little shacks stood trembling, enveloped in a cloud of dust, while the buffalo thundered past—not walking, but on the lope—a continuous hurrying procession for three days and three nights. The buffalo hunter was one of the first residents of the valley. One party of hunters, under contract to supply a firm at Buford with buffalo meat, killed as many as seventy animals daily. In a few years the buffalo disappeared from the valley, and
with the loss of their game the Indians moved away. This was one of the first steps in opening the valley to settlement.

This road reached Glendive in 1882, and after this time steamboating on the Yellowstone with General Murphy's command, families have found comfortable homes.

This road was later extended into Montana, Great Northern and Northern Pacific.

The long irrigation canal, stretching like a shining magic wand across the lands of the project, is transforming them with startling swiftness. A vast area in a thickly settled community. Framed in by gently sloping hills on the west, and by the river on the east, this town is surrounded by a part of the Irrigation Land, on the east, the valley is dotted with miles of broad fields of grain and growing towns.

Sixer, with a population of between four and five thousand, is the largest of these towns. It is a pleasant, prosperous place. It is an important center for the entire project. A branch of the Northern Pacific Road, at the lower end of the project. A branch of the Great Northern, road, at the lower end of the project. A branch of the Northern Pacific is now being constructed from Glendive down the valley to Sidney which will be extended farther to Montana, giving railroad transportation facilities.

There are good wagon roads throughout the district, and a network of telephone wires brings the farmers and townsmen into close touch with one another.

Water Power and Electricity.

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issued a second notice cutting the holdings

November 9, 1908, the Secretary of the Interior

Project were declared open to settlement by

up and flooded over the lands.

doing the work laterals and checked

being by homesteading, numerous tracts of various sizes are found

more than the 160 acres to which

together with the railroad lands on the

The soils of the project possess almost

This soil is nearly black with organic

Chinook winds from the west.

The prevailing winds of the region are

constant enough to make the use of wind

of the region are practicable, but are never of a serious

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The floods of irrigation is most

The main canals and main laterals are

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Separation of iron from Titanium.

Barney and Islam suggest a new method for the determination of titanium, which is much more sensitive and accurate.

The method is based on the volatilisation of titanium by hydrochloric acid, evaporation to dryness of the residue with sodium carbonate and a little sodium nitrate, which removes possible silica and magnesia, and with sodium bicarbonate, and sodium thiosulphate, which removes iron. The separation is then made by precipitating the titanous hydroxide with hydrochloric acid, filtering, washing, and drying in a desiccator. The final step is the determination of the titanic acid by boiling in acetic-acid solution, to which a little hydrochloric acid is added, and the precipitate is then determined.

A detailed description of the method is given. The school samples contain about 1 c. c. of hydrochloric acid. Then heat on an asbestos plate until sulphur-trioxide fumes are given off. Add five to ten grams of ammonium acetate and acetic acid to the solution and heat on a hot plate until the solution is complete and the volume reduced to about 20 c. c. Then to the solution add 2 c. c. of concentrated hydrochloric acid and transfer it to a separatory funnel, running out the backer with hydrochloric acid of sp. gr. 1.13.

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make a particle of difference what the trouble is or who is causing the trouble. In most cases one will not have much of a chance to fight anything. If we fully decide what is the trouble, we can change the condition. The Senior of the Golden School of Mines is full of information for the points of the compass, and wherever he goes the people of the state to see and to know him. The students of the Colorado Institution are to be found in politics, science, literature, and in a practical way the knowledge gained is at the school and utilities it is to solve mining problems.

A splendid type of young man is this graduate of the Golden School; you meet him in mines and mills wherever you go, and once the hallmark is identified, there after you will recognize him. He goes to his task with clear eyes, head up, a man unafraid. The hard drill that the course of study demands has served to stamp him with a courage and a confidence in himself which are quick to recognize. Enter a mine or a mill where great stoppage has been made in advance of established ideas; you are greeted by the man bold respond- ing, finding him a clear-eyed young chap in his ten year has gained weight. Such experiences may cost more, may polish and render more names of society and skill than busy wind mine of work they will, but this school abounds steadily at one farse, sending its graduates out to do a specific thing. You seldom have in this case to ask: "What did he do after he left school?" All you need to inquire is: "Where did he go?"

The last number of the quarterly journal of the Alumni Association is now out, and will interest a great many friends of the institution. It contains much of interest and, while we still have a hard time to make both ends meet and to present sufficient material together in time for the Magazine, we know that conditions are improving.

THE SCHOOL OF MINES.

According to the latest issue of the Quarterly Journal of the Colorado School of Mines at Golden has at present enrolled: Twenty-five graduate students, forty-five seniors, thirty-two sophomores, one hundred and fifteen freshmen; a total of six hundred and twenty students. These have come from higher schools all over the country and a number of special students have been brought from China. The list speaks well for the character of the institution, and helps the people of the state to see that in supporting a training school for young men who have a specific work to perform in the world, they are doing something of great value to and of great importance to the mining industry the world around.

Something of the efficiency, the thoroughness of the school is to be gathered from the study of the annual list. This shows that practically every graduate of the Golden school is at present actively connected in some way with the business of mining. The men and women of the school are working throughout the country for the good of the mining world.

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Athletic News.

MINERS SCRUB FIVE WINS.

Defeats Thunderbolts in Fast Game, 40 to 17

Golden, Colo., Feb. 2.—The Mines second team defeated the Manual Training High School team in a fast game tonight, 40 to 17. Harper and Bregman starred for the Miners with 12 points each. Reid was high man for Manual with three baskets and a foul. The Mine varsity lineup against Denver University tomorrow night in Denver.

The lineup:

MINERS. MANUAL.
Place Forward Hoskinson Forward Reid
Bregman Forward Reid
Galligan Center Judelowitz
Happer Guard Walter
Minister Guard DeWitt

Referee — Lannon. Umpire — Paulicheck.

MINERS BEAT MINISTERS AT BASKETBALL, 51 TO 25.

Feb. 4.—In a very audacious but nevertheless interesting game the School of Mines basketball team walloped the Denver University five last night to the tune of 51 to 25—or, to be more exact, they defeated Captain Wallace by the score of 51 to 22, as that man made all but three of the losers' points. Had it not been for his goal shooting D. U. would have been nearly shut out.

The Miners had wonderful team work, especially considering the fact that they were playing on a strange floor and one that is much smaller than their own. There were times when the Ore Diggers were passing the ball around so quickly that the Denver men did not even know where it was and stood around looking for it. The local men fought their best and never once quit. Their great fault was lack of team work and endeavoring to shoot the baskets from too great a distance. The champions were willing to pass the ball around until they were right under the basket before taking a shot.

Little "Johnny" Davis, the smallest man on the floor, was the bright star of the game. His goal throwing was nothing short of marvelous. Twice he threw baskets from the middle of the floor. The rest of the team were not far behind him. Captain Kissock, at center, although a head shorter than his opponent, always got the jump on him. He was always very accurate at throwing goals from fouls. On the defense, Rockwood, Litchfield and Tolman were like a stone wall when Denver got anywhere near the basket. The lineup:

MINES. DENVER.
J. Davis Forward... (capt.) Wallace
Tollman Forward Wells
Kissock, (capt.) Center; Davis
Litchfield Guard Brubaker
Rockwood Guard Bailey
Referee—Lannon. Umpire—Tracy.


STATE DEFEATS MINES.

Boulder, Colo., Feb. 17.—By playing superior basketball in every department of the game the University of Colorado five ran away from the State School of Mines here tonight and won by a score of 40 to 23. The contest was one of the fastest ever seen in Boulder, but the team work of the varsity was too much of a handicap for the Golden team and Colorado held the lead from the start.

The crowd which attended the game was the biggest which has ever been in the university's gymnasium and the sutures had to do service in the receiving line to accommodate the spectators. The lineup:

COLORADO. MINES.
MacPadden Forward... Davis
Cresto Forward... Rockwood
Taylor Center... Kissock
Accola Guard... Tolman
Andrus Guard... Place.

MacPadden, 3; Cresto, 5; Taylor, 5; Andrus, 5; Kissock, 5; Davis, 1; Rockwood, 1; Tolman, 2; Place, 1.

—Rocky Mountain News.

CHEYENNE QUINTET WINS FROM SCHOOL OF MINES.

Woolf No Match for Lamm and Wyoming Team Goes Ahead from the First

Cheyenne, Wyo., Feb. 10.—Superior team work on the part of the C. A. C. enabled the Cheyenne team to defeat the Colorado School of Mines team, by a score of 44 to 21, in the fastest game of basketball that has been staged in Cheyenne this season. The locals were called upon in the first half to use everything in their repertoire and toward the last of this session secured the advantage, the half ending 20 to 9 in favor of Cheyenne. Mines' crack Left Guard Woolf was no match for Lamm of Cheyenne.

—Rocky Mountain News.
Davis of the Mines. The Miners increased their lead in the second half by faster play­ing and consistent team work, and rolled up their lead in the second half by faster play­ing and consistent team work, and rolled up twenty-five points. Denver's points were in­duced many acts of bravery in many dif­ferent situations, and on the part of men of "Opportunity." Following this meeting the "Decision" at the meeting of February 21, 1918, was made public and the majority of the students voted three to two to exclude Sinton, but the ruling is still in the matter of conjecture.

A meeting at the Colorado School of Mines football game and the matter protested by Mr. J. C. Bryan, athletic director at the School of Mines, writer of the "Cough Medicine." The meeting at the Colorado School of Mines football game and the matter reported by Mr. J. C. Bryan, athletic director at the School of Mines, writer of the "Cough Medicine." The meeting at the Colorado School of Mines football game and the matter reported by Mr. J. C. Bryan, athletic director at the School of Mines, writer of the "Cough Medicine." The meeting at the Colorado School of Mines football game and the matter reported by Mr. J. C. Bryan, athletic director at the School of Mines, writer of the "Cough Medicine."
THE MILLER CONCERT COMPANY.

Everyone who attended the concert given by the Miller Concert Company on the evening of January 2, was delighted by the character of the music, and the high-class of readings selected by Miss Miller. She was easily the leader of the company, even though the other members were very strong in their respective lines.

Mr. Ralf Hauser, tenor, made a strong impression upon the audience by his interpretation of popular and operatic music. Mr. Kossoy, the violinist, was a real master of that most difficult instrument, the viola. While the pianist, was an artist of marked ability.

The Alumni.

ALUMNI MEETING.

There was a meeting of the executive committee in President Titsworth's office Wednesday, Feb. 23, at 4:30 p.m. to canvass and make recommendations for the Alumni member of the Board of Trustees.

The members present were: F. R. Titsworth, president; A. R. Hodgson, secretary; T. P. Ellis; J. B. Johnson; and Orville Harrington, assistant secretary.

The vote was canvassed and a resolution was adopted which gave the result in detail and emphasized the president to select two members of the Alumni to form, with the president, a committee to wait on the Governor and to urge his appointment. At the meeting it was decided, for various reasons, to keep the result of the balloting secret, but, as the result got out a day or so later everyone was aware of it.

Mr. Steinhauer, the pianist, was an artist of master of that most difficult instrument, the viola. Mr. Whip, the pianist, was an artist of the highest attainment, and Mr. Whip, the pianist, was an artist of the highest attainment.

The meeting then adjourned.

ALUMNI BANQUET.

The second annual scholastic banquet of the Alumni Association was held at the University Club, Denver, Saturday evening, February 25. Everyone present had a very enjoyable time.

The dining room was decorated with the School of Mines Intercollegiate Championship pennants. The tables were tastefully adorned with smacks and waves of white carnations.

The menu was good and satisfying, thoroughly mixed up with all the songs we know, and, although the other members were very strong in their respective lines, it was the result of the balloting that we had to keep.

Then I saw the awful as I say, "Oh, Lord! Was I ever that big a fool?"

"Do you live within your income?"

"I don't know, and I'm crowded for space."—Yale Record.

The meeting then adjourned.

IN LATER DAYS.

An old "grad," who happened to see a streetcar, thought it would be amusing to say something which appeared to him an obvious truism, but, when he did so, it was at the expense of his status, as follows

"When I see a youth with his hands turned up and his beautiful socks on view."

And when one eye peered a little round hat, with a ribbing of purple or blue.

And fourteen rings and seven plus that he got at his dear prep school.

"Why, it strikes a cord and I say, "Oh, Lord! Was I ever that big a fool?"

"Do you live within your income?"

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S. M. Soupcoff is in the surveying corps of the Alberta Irrigation Co., of Canada.

C. G. Warfel has been actively engaged in hydraulic work recently and will have some experience to contribute to the discussion of mining problems.

C. Dupree Smith returned to Denver recently to devote his time to the business of the school.

The banquet ended shortly after midnight with the ringing of "Auld Lang Fye."

COMMUNICATIONS.

Hedley, Idaho, Feb. 7, 1911.

C. E. Lesher was in Denver recently to sign an agreement with the school for work on the Alamosa Irrigation Co., of Colorado.

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not offend but may prove to be a push in the right direction. Further, should any offense be caused, we will be only too ready to make personal satisfaction to one and all on our appearance at the commencement, which will be Wednesday before commencement, midnight being the noon.

Yours in the Alumni Association,

T. D. DREW
LOUIS SCHAEFER
E. C. BROOKS

[The matter of entertainment for the graduates at commencement has been taken up between President Alderson of the school, and President Thistlethwaite of the Alumni Association. Any other remarks on the subject or on any of the other subjects above mentioned will be welcomed.]—(5.

Drewry, Colo., Jan. 21, 1911.

Mr. W. J. GILBERT, '09

Dear Sir: In the January issue of the Colorado School of Mines Magazine, a ste

mum has been started under the title of "A history of the criticism raised by a letter from Mr. Enrich to the principal physical characteristics of the

While not knowing Mr. Enrich personally, and not intending to denote or denote our presence, I still think he has a keen of grievance which he has expressed quite plainly.

Mr. Enrich, in due, has that feeling that many of us must have felt some time in our relations with the other Alumni, but it is not expressed in the most happy terms. I have been in contact with him at different meetings, but not because I didn't want to, but because I have always known that I can not tell about the spirit of such occasions, but I have notices that a great deal of the C. S. M. graduates in their year or instruction to get acquainted with one another. What I do not do, the earlier or older graduates or members of the Alumni Association. While the letter is in the Alumni Association, I have been excluded from the right to participate in the discussion of material that has been obsolete to the extent that it is no longer kept. One of the last persons to notice the discussion is the editor of the book, and the additions of new and valuable material which may be desired to include in the portions omitted. Throughout the book one notices new cuts that were formerly illustrated with pieces of equipment. Whole chapters have been omitted or slightly altered in the new edition. The book has some 900 pages (200 of which are in italics. Figures after each name of mineral are in italics. The book is now used as a text-book in at least one college or university. The book is neatly and strongly bound and can be had at any bookstore. The book is a complete and accurate set of descriptive notes on Prof. H. B. Patten's course in mineralogy at the Colorado School of Mines. The author shows that the oldest Archean rocks are a complete and accurate set of descriptive notes. Ancient man is left entirely out of the book. An additional note: the owner may wish to include. However, the essential data are valuable and must be added to the volume of what he may wish to include. The book is now used as a textbook in the schools. The book is available to anyone who may wish to include. The book is now used as a textbook in the schools.

An extremely suggestive and valuable summary of a longer article that appeared in the Journal of Geology, Jan.-Feb., 1911. The details are given in the book. The book is now used as a textbook in the schools. The book is available to anyone who may wish to include. The book is now used as a textbook in the schools.

G. Montague Butler.

ABSTRACT OF CURRENT ARTICLES

Climate and Physical Conditions of the Rocky Mountains. By G. Montague Butler.

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senting what information they can to the Assistant Secretary at Golden:

E. M. Smith, '05.
Enrique A. Schuman, '97.
Wm. B. Middleton, '83.
Chas. E. Wheeler, '94.
J. J. Weisz, '09.
Howard Spangler, '05.
Chas. E. Webber, '96.

The Alumni Association has for some time been trying to locate the following graduates. Some of these have not sent in their address for several years. If any of the readers of the Magazine know the whereabouts of any of the following men, they will be helping the work along by

- T. A. I. M. E. Bul. 48, p. 965.
- Mining in Nicaragua, by T. Lane Carter.