I REMEMBER ASPEN

by

FREDERICK BROWNE DOOLITTLE

I REMEMBER ASPEN

By

FREDERICK BROWNE DOOLITTLE

June 1971

PROLOGUE

After reviewing Josiah Edward Spurr's "Aspen Mining District, Colorado," Caroline Bancroft's "Famous Aspen" and Luke Short's "The Danger Hole" it occurred to me that I might supply some personal recollections not published in the foregoing.

I was born in Aspen on May 14, 1900. My Mother was the oldest daughter of Colonel Edward F. Browne who brought his family to Aspen in 1886 via stage coach over Independence pass. My Mother recalls her thrilling experience when, as 13-year old Tempie Browne, she was allowed to ride on the high seat with the stage driver. My Father, Clarence E. Doolittle, came to Aspen in 1886 via stage coach over Taylor pass, as electrical engineer for the Aspen Electric Company, he having graduated from Cornell University in 1885. I went to both the Washington and Lincoln schools, some grades in each, and to the Aspen High School. Although I was away much of the time attending the University of Colorado from which I graduated in 1922 and working the following year for the General Electric Company in Schenectady, New York, I considered Aspen my home town until my family moved to California in October 1923.

MY HOMES IN ASPEN

1900 to 1917
126 W. Francis St.

1917 to 1923
135 E. Hallam St.

This house recently known as Gibson Girl was sold for $1500 in October 1923.

THE TRAINS

D & R G

According to the Aspen Times of June 21, 1934, early in 1887, the Denver and Rio Grande railroad, which had then progressed as far as Red Cliff, awarded a contract for the extension of the railroad from that city to Aspen, via Glenwood. Laying of track was started early in the year and all the towns along the line awaited the coming of the "iron horse" with bated breath.

On October 27, 1887, the Times proudly recorded the fact that the rails had struck the bridge over the Roaring Fork at 3:40 p. m. and the railroad had come to Aspen, welcomed by screaming whistles and the roar of exploding giant powder.

Preparations, which had been underway for weeks, to welcome the conquering heroes, in this case the track layers, were rapidly brought to a head and on Saturday a barbecue, under the supervision of George Frost, was tendered the men. Among the edibles consumed on this historic occasion were, two bullocks, two veals, two sheep, 100 pounds weinerwurst, 300 loaves of bread, barrel of pickles, 100 pounds of bologna, fifty barrels of beer and other goods in proportion. More than 600 attended the barbecue.

On Tuesday, November 1, 1887, the formal reception and banquet, celebrating thecoming of the railroad was held. A large arch of welcome reading "welcome D. and R. G." in varicolored electric lights, hung over Mill street, just north of Main.

As recorded by F. E. Browne in his "Memoirs of Edward Frederick Browne,"the first train was composed of luxurious Pullman Palace Sleeping cars, the "Argentite," "Maid of Erin," "Mexicano," "Ouray" and other well known narrow gauge sleeping cars. Among the guests were D. H. Moffat, E. O. Wolcott, H. M. Teller, Alva Adams, Eben Smith, John Arkins and some twenty or thirty equally prominent citizens of the State.

That evening a banquet attended by some 248 people, was given by the citizens of Aspen, to the invited guests who had made the journey from Denver. After the guests were seated, Colonel Ed F. Browne, the toastmaster, arose and addressed them as follows:

"Toasts now being in order, I wish to ask your attention. Next in importance to Aspen, following the discovery of this great camp, that gives promise of equaling if not surpassing the bonanza Comstock Load, is the fact that the railroad connection has placed us in close contact with our smelters and coal fields."

THE TRAINS Con'td

D & R G con'td

"The second event in the history of Aspen is that which calls us together tonight. The citizens of Aspen are elated on this occasion, and with true western spirit, they did not care to jollify alone so they invited you to be with them. We feel honored by your presence. We feel that Denver, the representative city of Colorado, has come to be glad with us. We thank you gentlemen for your presence."

When it is considered that all luxries up to this time, had to be shipped by stage coach, the menu at the banquet is worthy of mention as follows:

Blue Points on the half shell
Green Turtle soup
Broiled Mountain Trout
Buffalo Tongue, caper sauce
Roast Young Turkey
Fried Spring Chicken
Canvass Back Duck
Teal Duck
Quail
English Pheasant
Mountain Grouse
Venison
Elk
Dressed Crabs
Shrimp or Chicken salad
Pomeroy Sec or Mum's Extra Dry
Assorted Dessert
Coffee, Cognac, Cigars.

Following such an elaborate banquet, it is needless to say, the toastmaster, Col. Browne, had a hard time maintaining order. However this was done and some beautiful tributes were paid to the citizens of Aspen for their activities in adding so much wealth to the State.

Mayor H. L. Harding of Aspen, in his address of welcome, stated among other things the following.

"The Denver and Rio Grande Railroad with the most indomitable pluck and energy has passed over valley, stream and mountain ranges. It has spanned the wild and impetuous mountain torrent, has clambed the dizzy and apparently inaccessable heights, has run great tunnels through our snow capped hills and has, at length, descended into the peaceful and fertile valley of the Roaring Fork."

Senator Edward O. Wolcott responded to the toast "The Denver and Rio Grande Railroad" and told of a company which through its officials and engineers, had constructed a railroad through a country that heretofore had been considered inaccessable.

THE BRIDGES

Aspen seemed to meet its nemesis with bridges. The Colorado Midland railroad tracks got to Maroon Creek some months before the D. & R. G. got to Aspen. The Midland would have won the race to Aspen but it had no bridge to cross Maroon Creek.

The iron bridge to cross Castle Creek at the West end of Hallam Street was too short to reach from 'shore to shore' so wooden extensions were added to each end. These served well for a long time until someone set fire to both extensions at once. The wood extension onthe West end burned up because no hose cart could get to it on account of the fire on the East end. Traffic crossed Castle Creek via the bridge at the power house for several weeks.

About 1912 another too short bridge showed-up, this one to get the Brush Creek road across Maroon Creek. Since the bridge wouldn't reach across where the road was, the bridge was put where it would fit and the road was detoured around the West end of Red Butte to get to the bridge. I remember this bridge because it was constructed of structural steel members connected together by rivets. On Saturday, I rode my bike out to observe construction progress and really helped (?) by turning the crank on the blower for the forge that heated the rivets. Red hot rivets were picked out of the forge with tongs and tossed to a man who caught them in a bucket near where they would be used before they cooled off.

WINTER SPORTS

Skateing Along about Thanksgiving time several very cold nights were not unusual. When this happened all the lakes and ponds in the vicinity were coated with crystal claer perfectly smooth ice, ideal for skateing. This condition didn't last long because soon, the ice was covered with too much snow for removal with snow shovels by boys on skates. However, skateing for the season was not always terminated because a mile or so above Aspen the flowing water of the Roaring Fork would cut out the ice and snow leaving the length of 'still water' exposed for new ice formation. Also, with water provided by the volunteer fire department, a skateing rink was formed on the vacant property next to the Isis theater across Galena street from the Armory Hall.

Coasting The favorite place to coast was Mill street, where bob-sleds could start up at the South end of the hard-packed snow, slide down through town at terrific speed, past the Jerome and on to the bridge across the Roaring Fork. For a repeat performance, the coasters had to pull the bob-sled back up the hill so not many trips were made in an evening.

Once when I was home from college for Xmas vacation, I got the battery out of the cellar, installed it in our 1916 Buick, put chains on the rear wheels, filled the radiator with hot water and found it possible to travel pretty well where the snow inthe streets had been packed solid by horses, sleighs and sleds. Using the Buick, I'd pull the bob-sled up about to the Wheeler opera house, turn around and the coasters on the sled would hold on to a trailing rope as the car went down Mill street to turn West on Mainstreet while the sled continued down Mill street. By this method a lot more trips were made in an evening.

Skiing We skied mostly to get around in deep snow or to hunt snow shoe rabbits which were mighty good to eat. My skis were 7-feet long and some of the mine timbermen who were Swedish had skis 11-feet long on which they could make phenominal cross country runs, one such being from Lenado to Aspen. The Swedish people particularly liked ski-joring around town in the evening. In this sport the skiers hung on to a long rope which was towed by a single horse. Nobody did much sliding down hill because it was either necessary to climb up to slide down or to climb back after sliding down depending on where you started.

Skateing on Hallam Lake

THE MINES

Before describing things that I remember about individual mines, I thought it would be of interest to list, by name, the astonishing number of mines investigated by Mr. Josiah Edward Spurr as included in his 1898 report to the U. S. Geological Survey entitled, "Geology of the Aspen Mining District, Colorado."

Aspen Mountain

North Slope
Bonnybel mine
Visino tunnel
Durant mine
Aspen mine
Schiller mine
A. M. and S. mine
Veteran tunnel
Durant tunnel
Homestake shaft
Enterprise tunnel
Argentum-Junita
Princess Louise
Hidden Treasure

West Aspen Mtn.
Pride of Aspen
Red Spruce shaft
Little Cloud tunnel
Mary B. mine
Baltic tunnel
Homestake of West Aspen Mtn.
Aspen Mining and Drainage tunnel

West Side
New York tunnel
Great Western tunnel
Galena tunnel
Late Aquisition mine

Queens Gulch
Debuque tunnel
Continental tunnel
Gray Carbonate tunnel
Yopsie tunnel
Little Annie mine

Turtelotte Park

Bay State shaft
Ruby mine
Little Percy mine
Best Friend mine
Bob Ingersoll mine
Dixon shaft
Mayflower tunnel
San Jacinto shaft
Sam Houston shaft
Saddle Rock shaft
Hannibal mine
Jay Gould mine
Buckhorn No. 2
Long John shaft
Adelaide shaft
Camp Bird shaft
Good Thunder mine
Iowa Chief mine
Celeste & Edison
Little Lottie mine
Justice mine
Last Dollar mine
Minnie Moore mine
O. K. mine
Little Rule tunnel
Sarah Jane mine
Highland Light shaft

Smuggler Mountain

Molli Gibson mine
Smuggler mine
Cowenhoven tunnel
Della S. mine
Bushwhaker mine
Park-Regent mine
Mineral Farm mine
Alta Argent mine

Lenado
Aspen Contact mine
Leadville mine
Bimetallic tunnel
Tilly shaft

Others not in Spurr report

The Aspen Deep Mining Company
The Park Tunnel Mining and Milling
The Richmond Hill Mining Milling and Leasing Co.
The Hope Mining, Milling and Leasing Company
Midnight tunnel
Newman tunnel = Percy LaSalle
J. C. Johnson
A. J.

INCORPORATED UNDER THE LAWS OF COLORADO.

No. _____ Shares _____

THE ASPEN DEEP MINING COMPANY

CAPITAL STOCK, $2,000,000

2,000,000 SHARES, $1 EACH

This is to Certify That C. E. Doolittle is the owner of Five thousand Shares of the Capital Stock of THE ASPEN DEEP MINING COMPANY, *full paid and non-assessable.*

This Certificate is transferable only on the books of the Company, in person or by attorney, on surrender of this Certificate.

In Testimony Whereof *the President and Secretary have hereunto attached their signatures and caused the seal of the said Company to be affixed this* 19th *day of* November *A. D. 189*1 *at Aspen, Colorado.*

L. L. Smith
SECRETARY.

Jno. R. C. Brown
PRESIDENT.

STOCK NON-ASSESSABLE.

KELLY PRINT, DENVER.

For Value Received, ...

hereby sell, assign and transfer to .....

.....

.....

.....shares of the within mentioned stock, and

.....do hereby constitute and appoint .....

.....

.....

attorney, irrevocable for .....and

in .....name to transfer the same on the books

of the Company, with full power of substitution in the

premises.

WITNESS .....hand and seal this

.....day of ..... A.D. 189

C E Doolittle .....[Seal.]

Witness present, ...

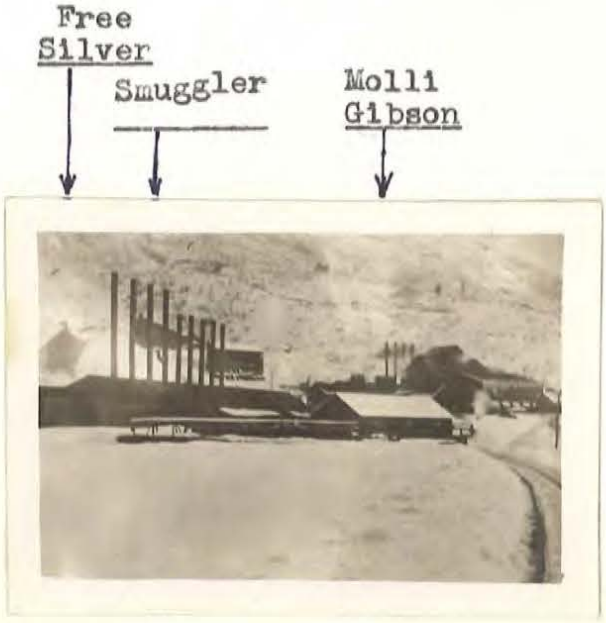
.....

FREE SILVER SHAFT

My earliest recollection of the Free Silver was viewing from in front of our home on West Francis Street, a most spectaculer fire which destroyed the shaft house. Next, in about 1912, I remember that my Mother fixed a lunch, including a bottle of iced tea, for my Dad who was down at the 12th level overseeing the electrical connections to the pump motors which were being installed. I was deligated to take the lunch to the mine and give it to someone who could take it down to my Dad. Probably this incident would not have impressed me if one of the men at the mine had not asked what was in the bottle and when I said iced tea the man said 'oh yeah' and a lot of men laughed.

Later, when the electric pumps were in normal operation, I was privileged to visit their location with my Dad. It was hot, humid and exceedingly interesting.

The final information that I have of the Free Silver is sad indeed. On Saturday January 4, 1919 the big electric pumps were stopped. They saved all of the motors and two of the pumps. They had expected to save all of the pumps, but when the cage in the Free Silver shaft dropped, the large gear on the hoist broke in many pieces. The cage had stuck in the shaft (due to ice) and the engineer must have allowed a lot of slack cable to pile up on top of the cage. This extra weight caused the cage to free itself and drop as far as the slack would allow it to go. The man on the cage was killed.



SMUGGLER MINE

I remember, as a youngster in Aspen, checking my dollar watch and waiting to see the plume of steam from the noontime whistle at the Smuggler mine and then counting seconds until hearing the sound. Later, as a high school boy, I had a job six days a week changing charts on Bristol recording ammeters, located one each, in the meter house at the Free Silver, in the hoist engine room at the Smuggler and at the A-J near the Durant tunnel at the base of Aspen Mountain. At the Smuggler hoist, I was facinated by the beautiful steam engine, running on compressed air, there being no steam available after the electric pumps were operating. Also my curiosity was aroused by the odor of sulfur dioxide issuing from the shaft and was told that it came from burning sulfide rock down in the mine.

The fact that the rock formation was burning in part of the Smuggler mine, as far back as I can remember, prevented mining some of the richest ore due to heat. Efforts toextinguish the fire by excluding air with thick bulkheads were unsuccessful. About 1914, the U. S. Bureau of Mines sent a mine safety car to Aspen and their personnel supervised an attempt to extinguish the fire with water. A high pressure water line from the pump column was run through one of the bulkheads. When the water was turned in, steam came out scalding the men, some of whose lives were saved only by gas masks and protective clothing. Despite this steaming, the formation continued to burn.

Pumping of water from the Smuggler and connecting mines ceased on January 4, 1919. Since then the mines have been flooded and the fire must be out. When the mines were operating they pumped some 2000 or 3000 gallons of water per minute about 1200 feet. The largest pumps were located at the bottom of the Free Silver shaft. Since wood continuously submerged in fresh water does not decay, it seems probable that timbered portions of these mines might be intact and therefore extensive underground exploration and sampling should be possible if the mines were unwatered and access from the surface re-established.

Now that silver, lead and zinc are in great demand, it seems to me that operation of these mines might again be profitable and I am surprised that none of the executives of important industries who have come to be invigorated at the Aspen Health Center or to ski have not investigated this possibility.

DURANT

While in high school, I had a job which required six day a week visits to the lower Durant tunnel entrance to change the chart on the A-J Bristol recording ammeter. This was a good place to find out whether it was summer or winter. In summer, a brisk cool breeze slightly tainted with powder smoke issued from the tunnel. In winter, the draft was in the opposite direction, cold winter air entering the lower Durant tunnel, being warmed by the prevailing 50 degree underground temperature, on its way through and up about one thousand feet to where it returned to the atmosphere via the upper Durant.

The underground trip of about a half mile in the lower Durant tunnel on 'go-devils' which were propelled by leg power and ran on the mine tracks, stopping to view the underground water fall, then riding on the cage which was lifted some seven hundred feet up the winze by an underground electric hoist and then mountain climbing through a large stope to a ladder leading to the upper Durant, was a tourist attraction supreme. However, in those days there were no tourists so the trip was enjoyed principally by new school teachers, high school boys and an occasional VIP.

School Teachers and High school Boys
in the Durant.

PARK TUNNEL

During the summer of 1918, I was a groundman on the crew that built a 600-volt DC line from the Castle creek powerhouse to the Park tunnel located on West slope of Aspen Mountain near the top. Crossarms, insulators and wire were hauled up the road on the East slope of the mountain and then man-handled down the west side along the route of the line. Much of the conductor was 4/0 solid copper (about 1/2 inch in diameter) which had been salvaged from some mine. One man started down from the Park pulling a length of this conductor. Unfortunately, he pulled it under many tree trunks which had been felled to clear the route of the power line. When Charley Reuter, the boss, discovered this he was somewhat perturbed and ordered this length of wire pulled on to the bottom of the mountain but this time over the felled trees. This would have been OK except for the fact that the wire slid down over the slick logs and the man in front couldn't stop it and had to scurry for high ground to save himself from being entangled in the resulting mess. Needless to say, additional lengths of wire were handled by two men, one in front to guide it over the logs and one behind to keep it from sliding.

Despite the difficulties due to the steepness of the mountain side, this line was completed and lights at the Park tunnel were visible at night for several miles along the highway between Woody and Aspen.

THE GLORY HOLE

One afternoon the line crew was summoned back to town because some 3 or 4 poles had dropped out of a line into a hole in the ground along with several ore cars and some railroad tracks. In a short time we were able to clear the power line conductors from each other and restore service to the A-J pump via a long span of wires which sagged into the HOLE well below the original ground level.

When I visited Aspen in 1970 I couldn't find the hole in the ground nor much of the Durant tunnel dump so I assume they had gotten together and now support the Glory Hole Lodge.

LOOKING INTO THE GLORY HOLE

INCORPORATED UNDER THE LAWS OF THE

STATE OF COLORADO

No. 64

25 Shares

The Park Tunnel Mining and Milling Co.

CAPITAL STOCK, 150,000 SHARES

THIS CERTIFIES THAT Frederick D. Doolittle is the owner of

TWENTY-FIVE Shares of ONE DOLLAR each of the Capital Stock of

The Park Tunnel Mining and Milling Company

transferable only on the Books of the Corporation in person or by Attorney on surrender of this Certificate.

SHARES $100 EACH

In Witness Whereof the duly authorized officers of the Corporation have hereunto subscribed their names and caused the corporate Seal to be hereto affixed this 6th day of Sept A.D. 1918

Grant M. Yates
Secretary

Jeff Shaw
President

SHARES $100 EACH

NON-ASSESSABLE

NOTICE: THE SIGNATURE OF THIS ASSIGNMENT MUST CORRESPOND WITH THE NAME AS WRITTEN UPON THE FACE OF THE CERTIFICATE, IN EVERY PARTICULAR, WITHOUT ALTERATION OR ENLARGEMENT, OR ANY CHANGE WHATEVER.

For value received ..... hereby sell, assign and transfer unto .....

..... the ..... Shares of Stock within mentioned and hereby authorize

to make the necessary transfer on the Books of the Corporation.

Witness ..... hand and seal this ..... day of

..... A. D.

Witnessed by .....

CERTIFICATE

FOR

25

SHARES

OF THE

CAPITAL STOCK

OF THE

Park Tunnel Mining and Milling Co.

ISSUED TO

Frederick B Doolittle

DATED

Sept 6th 1918

LITTLE ANNIE

During the summer of 1919, I was a lineman and truck driver on construction of the first 3-phase 13000 volt alternating current power line in Aspen. The route of this line was from the powerhouse up Castle creek, thence up Queen's Gulch to the Midnight tunnel, then over the top of the mountain to the Little Annie mill and on down to the Hope tunnel. On this job, our transportation was a Ford Model 'T' pick-up with a Moore auxiliary transmission which, in low range, combined with low gear resulted in a 20:1 ratio. This truck with 5 men mostly aboard, but sometiomes with 3 pushing, made many daily trips to the Little Annie mill. The gas tank was under the seat, so going up steep grades, the carburetor was higher than the gas tank so needed air pressure in the tank was provided by a stroke on a tire pump connected to the tank through a tire valve soldered to the gas tank cap. Going down hill, in addition to engine compression in low-low gear, so much braking was required that the brake band had to be replaced after each two trips. As truck driver, it was my job to change these bands after work and fill the tank with gasoline strained through a chamois skin (to eliminate water) before working hours in the morning for which I received additional compensation of 50 cents per day.

Jim Carver contracted to produce 35-foot poles for this line and deliver them with the butts to the holes and the tops pointed up-hill for $5.00 each. It was specified that the poles be peeled, butts cut square and the tops roofed. The poles were rocky mountain type Douglas fir (colloquially called red spruce) many being cut within a few feet of their destination. Jim Carver's equipment consisted of a double bladed axe which he kept razor-sharp with a whetstone, a horse, singletree, chain and skidding dog. Carver's skill with his axe was apparent in that the butts of the poles were square and as smooth as if they had been sawn.

Most of the holes in which the poles were to be set were in rocky ground and consequently two men were used to dig each hole, one to loosen the dirt and rocks with a digging bar and the other to muck out with a long handled "spoon." I, being the lightest and youngest member of the crew was assigned to work with the biggest and strongest man who happened to be a miner, sentenced by the doctor to work outside a while to try to recover from "lead poisoning" supposedly from working in a lead mine but later determined to be arsenic poisoning from drinking crystal-clear, ice-cold water from an underground spring. Our method of digging was not conventional because, instead of trying to lasso a loosened boulder with a chain, I would dive into the hole head first and grab the boulder with my hands whereupon my partner would lift both me and the boulder out of the hole.

LITTLE ANNIE Cont'd

The 13000-volt conductors were No. 6 hard drawn copper wire. Stringing started at the powerhouse where the conductors were solidly grounded. Despite this grounding, when we reached the higher elevations, it was a 'shocking experience' to touch any of the wires unless they were also grounded locally.

After the line was in service, a lightning arrester was connected to each conductor at a pole near the top of the mountain where there was a spring of water to provide good ground. The method of connecting to an energized conductor involved driving a 6-inch lag-screw into the pole about 10-feet above ground, attaching a ground chain to the lagscrew and pulling the ground chainover the one conductor to which a connection was to be made. The purpose was to bring the upper part of the pole to line potential so, using bare hands, the lineman could make the connection to the energized conductor. WARNING The method worked only because the 13000-volt circuit was part of a small ungrounded delta connected system.

Both the anticipation of profit from the Little Annie and later frustration can be gleaned by perusal of the following pages pertaining to the Richmond Hill Mining, Milling and Leasing Company.

CONNECTING
LIGHTNING ARRESTERS
TO 13000-VOLT LINE

LITTLE ANNIE MILL

NUMBER 86

SHARES =200=

The Richmond Hill Mining, Milling & Leasing Co.

CAPITAL STOCK, 50,000 SHARES

This Certifies that F. B. Doolittle is the owner of

TWO HUNDRED Shares of the Capital Stock of

The Richmond Hill Mining, Milling and Leasing Company

transferable only on the books of the Corporation by the holder hereof in person or by Attorney, upon surrender of this Certificate properly endorsed.

In Witness Whereof, the said Corporation has caused this Certificate to be signed by its duly authorized officers and to be sealed with the Seal of the Corporation this 21st day of October A.D. 1919

Grant M. Yates
Secretary

W. H. Cornwall
President

SHARES $1.00 EACH

13

CERTIFICATE

FOR

= 200 =

SHARES

OF THE

Capital Stock

The Richmond Hill Mining,
Milling & Leasing Co.

ISSUED TO

F. B. Doolittle

DATED

Oct 21, 1919.

For Value Received ____ hereby sell, assign and transfer unto ____ Shares of the Capital Stock represented by the within Certificate, and do hereby irrevocably constitute and appoint ____ Attorney to transfer the said Stock on the books of the within named Corporation with full power of substitution in the premises.

Dated ____ 19__

In presence of

NOTICE. THE SIGNATURE OF THIS ASSIGNMENT MUST CORRESPOND WITH THE NAME AS WRITTEN UPON THE FACE OF THE CERTIFICATE IN EVERY PARTICULAR, WITHOUT ALTERATION OR ENLARGEMENT OR ANY CHANGE WHATEVER.

Richmond Hill Mining, Milling and Leasing Company

ASPEN, COLORADO, NOVEMBER 10TH, 1921

MR. C. E. Doolittle,

Aspen, COLORADO.

DEAR SIR:

Inasmuch as The Richmond Hill Mining, Milling & Leasing Company has not been operating since it closed its properties down October a year ago, but has kept its leases alive by keeping enough men on the premises to fulfill the requirements of the leases, and the expense in so doing has been borne by a few of the stockholders here. We have devised plan after plan to work the property and honest attempts have been made to carry them out but without avail. Now at last it has come to a pass that something must be done quickly, or else our leases will revert back to The Hope Company. These few stockholders can no longer carry the load alone.

The directors have worked tirelessly to bring about some satisfactory plan to place the property on a workable as well as a paying basis.

We have finally carried the proposition to Mr. J. T. Boyd and his associates, who have the latest methods that are successful in the flotation of oxide ores. Mr. Boyd is an Aspen mining man and is at present general manager of The Silver Mines Company of America, which company has already expended thousands of dollars in the mining game here. Mr. Boyd and associates have undoubtedly the only flotation process whereby oxide ore can be successfully and commercially worked. His processes are protected by United States patent.

We have sub-leased the Richmond hill property to Mr. Boyd and his associates with the understanding that he give the old stockholders a chance to come in the lease with him.

The plan is as follows:

The capital upon which Mr. Boyd will figure profits will be $16,000.00. The actual capital will be $12,000.00 and this will be used for the working capital for the property, Mr. Boyd taking one-fourth, or $4,000.00, for himself and associates interested in the patented process he will use, to pay him for his process and to manage the lease.

You are invited to invest what you think you can and want to stand, and whatever you do invest will represent so many sixteen-thousands of the whole. For instance, if you invest $100.00 your investment will represent 100 16000ths of the whole.

Two contracts are enclosed herewith. Upon receipt of this letter you are to make known at once to Mr. Boyd how much you care to invest; sign them both, keep one of them, and send the other to Mr. Boyd, together with one-tenth of the amount you subscribe, and the other nine-tenths you will hold yourself in readiness to send to Mr. Boyd upon his demand. No further time will be given. One-tenth must accompany your contract and the balance of nine-tenths just as soon as you receive Mr. Boyd's request for it.

You will by this method have a chance to protect yourself.

Read the contract carefully, for it will give you the full details. Then make your investment in accordance therewith, if you so desire. Otherwise your stock will participate only in the royalty paid The Richmond Hill Company, which will be five per cent over the amount of the royalty paid The Hope Company on shipping ore, and ten per cent of the profits of Mr. Boyd on the mill ore after all operating expense has been deducted.

Remember this letter must be answered at once, so kindly govern yourself accordingly. No investment will be received after the 25th day of November.

Very truly yours,

WM. H. CORNWALL,
C. E. DOOLITTLE,
AXEL JOHNSON,
JOSEPH MELLOR,
FRANK M. YATES,

Officers and Directors of The Richmond Hill Mining, Milling & Leasing Company.

I have read above letter and it agrees with my understanding of the matter. It is understood that if the amount to be raised is over subscribed I reserve the right to return to each subscriber his proportion of the over subscription.

(Signed) J. T. BOYD.

To Those Having An Interest In the Annie Lease.

ASPEN, COLORADO, DECEMBER 16, 1921.

Mr. C. E. Doolittle,

Aspen, Colo.

DEAR SIR:

Up to the present time the work accomplished is as follows:

MINE WORK

The old Cooper tunnel was opened so as to permit access to the upper workings and oxidized ore above No. 2 level. Some ore was broken by hand in the oxide country and sent to the mill.

The main chute was partly relined to make it safe. The mine, otherwise, needs but little work done as far as repairs go.

MILL WORK

We were fortunate in finding the mill in better shape than we expected. With one change in the classifier we were able to put it into shape for immediate operation. We did not have to spend over $200 to get the whole mill in shape for starting.

ORE TESTS

We brought down some ore from the dump and also from the chute underground and ran it through the mill. The first assays showed a mill saving of 70 per cent on a low grade ore.

Up to the present we have not run enough oxide ore through the mill to determine either the grade of the ore or what the mill will do on this ore. The assays in the stope are encouraging, (11 to 13 ounce average). The ore to be fairly sampled has to go through the automatic sampler at the mill.

In order to give the mine and mill both a fair trial it has been decided to run until Christmas time. If things continue to look good, we will continue as by that time we shall have a better idea of the value of the ore.

Up to the present we have made from 10 to 15 tons of concentrates and should have a car out by then.

Accordingly, to give us the necessary funds to carry us through, it has been decided to call upon you immediately for the balance of the money due from you to make up the payment on the interest you desired to take; but, if not convenient, you may pay one-half now and complete the entire payment January 15th.

If the ore holds up in grade to the samples and the mill makes a good saving, we can make money FAST. If it looks as if the ore were going to be lower in grade than the samples, or give us any trouble in any other way, we can shut down, return to each the balance due him, and his proportion of the returns from concentrates, and thus no one could lose much—which makes it well worth going into.

J. T. BOYD.

NOTICE

TO PEOPLE INTERESTED IN THE LITTLE ANNIE LEASE:

After running the Little Annie mill during the month of December and a few days in January it became apparent that no money could be made on such operation, the mill was cleaned up and closed down. The concentrate produced during the test was shipped. The balance of the money in the treasury will be returned to those interested in proportion to the amount subscribed and paid in. A statement follows:

EXPENSE—	November	$1,268.65
	December	2,048.48
	January	780.68
	TOTAL EXPENSE	$4,097.81
	Receipts from sale of Concentrates	772.03
	TOTAL NET LOSS	$3,325.78

The loss represents 29.90 per cent of the amount subscribed. The percentage between that and percentage paid in will be returned to each person interested. All but one or two small interests paid up their subscription—which would make slight difference.

In regard to operation: We started stoping in the best stopes left in the mine. Some of the previous Richmond Hill officials believed the pillar remaining between the old top stopes and the surface assayed from 15 to 30 ounces silver. On this we based any hopes for successful operation. There was no practical way of sampling this except by making a mill run. It was believed that the previous mill work was poor and that there was plenty of ore in the mine which would run 12 ounces or better. When we began stoping on the top pillar, we broke ore from it wherever we could reach it. Instead of going 20 ounces the mill run showed about 6 ounces, with days down to 3 ounces. Other stopes in the mine supposed to run 12 or 15 ounces we found to average 7.5 ounces on running through the mill. Still other stopes were found to average 5.5 ounces.

Inasmuch as it requires an average of 8 ounces in the ore to come out even and about 10 ounces to make any money it is apparent that mill operation here would not pay on the present ore showing.

We did some development work in the only place we thought we might open up anything in a limited time, but on running into old workings on the Midnight side we gave up and finished.

The mill did very satisfactory, averaging 65 to 75 per cent saving of values. The ore now exposed is too low grade to pay and there is no use spending any more time or money with our limited capital.

The lease extends but 100 feet below the tunnel level and with only that amount of ground our capital does not warrant any unwatering to do further development.

Books and data are open for inspection at this office.

Very truly yours,

J. T. BOYD, TRUSTEE.

NUMBER C 987

SHARES 100

The Hope Mining, Milling and Leasing Company

CAPITAL STOCK 300,000 SHARES

THIS CERTIFIES THAT Mr. Jospie B. Woolette is the owner of One Hundred Shares of the Capital Stock of

The Hope Mining, Milling and Leasing Company

transferable only on the Books of the Corporation in person or by Attorney on surrender of this Certificate

In Witness Whereof the duly authorized officers of the Corporation have hereunto subscribed their names and caused the corporate Seal to be hereto affixed this 27 day of Oct. A.D. 19 33

Benjamin R. Kobey SECRETARY

G.W. Parmer PRESIDENT

SHARES $1.00 EACH NON-ASSESSABLE

M 28

NOTICE: THE SIGNATURE OF THIS ASSIGNMENT MUST CORRESPOND WITH THE NAME AS WRITTEN UPON THE FACE OF THE CERTIFICATE, IN EVERY PARTICULAR, WITHOUT ALTERATION OR ENLARGEMENT, OR ANY CHANGE WHATEVER.

For Value Received, I hereby sell, assign and transfer unto The Little Annie Mining Company

Shares of the Capital Stock represented by the within Certificate and do hereby irrevocably constitute and appoint

Attorney to transfer the said Stock on the books of the within named Corporation with full power of substitution in the premises.

Dated ________ 19__

In presence of

T. B. Doolittle

Mrs. Sophie P. Doolittle

CERTIFICATE

FOR

100

SHARES

OF THE

CAPITAL STOCK

OF THE

HOPE M., M. & L. CO.

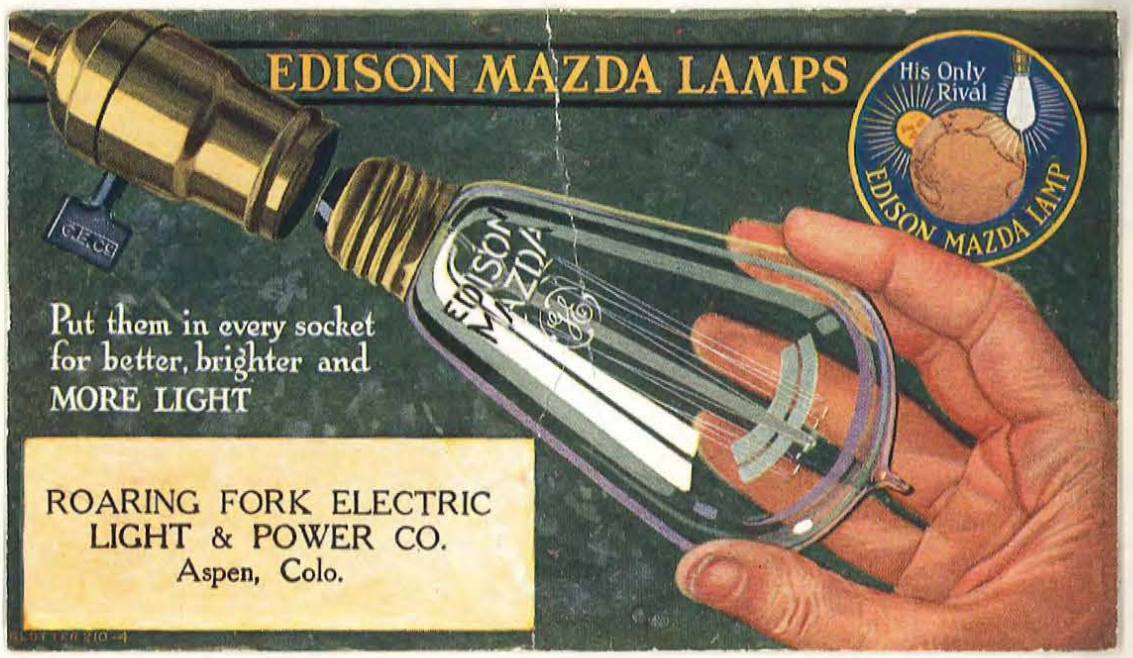
Aspen, Colorado

ISSUED TO

Mrs. T. B. Doolittle

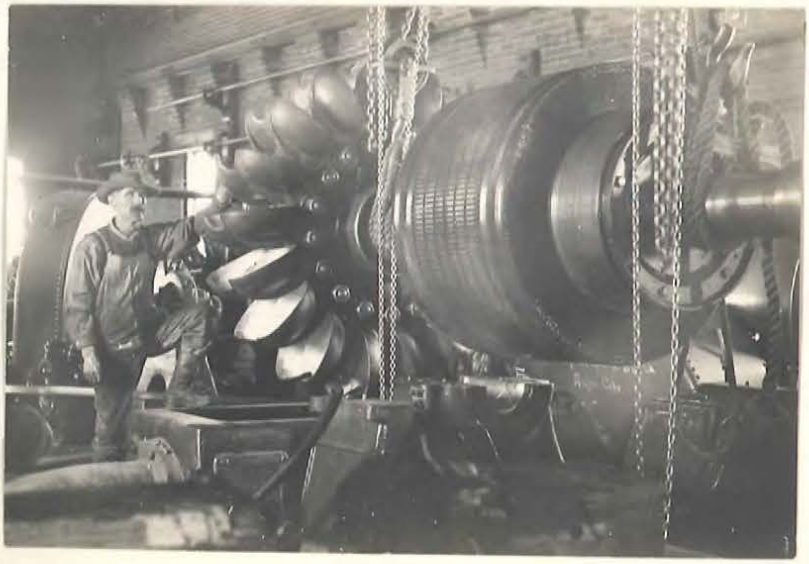
DATED

Oct. 31 '33


EDISON MAZDA LAMPS
His Only Rival
EDISON MAZDA LAMP
EDISON MAZDA
Put them in every socket
for better, brighter and
MORE LIGHT
ROARING FORK ELECTRIC
LIGHT & POWER CO.
Aspen, Colo.

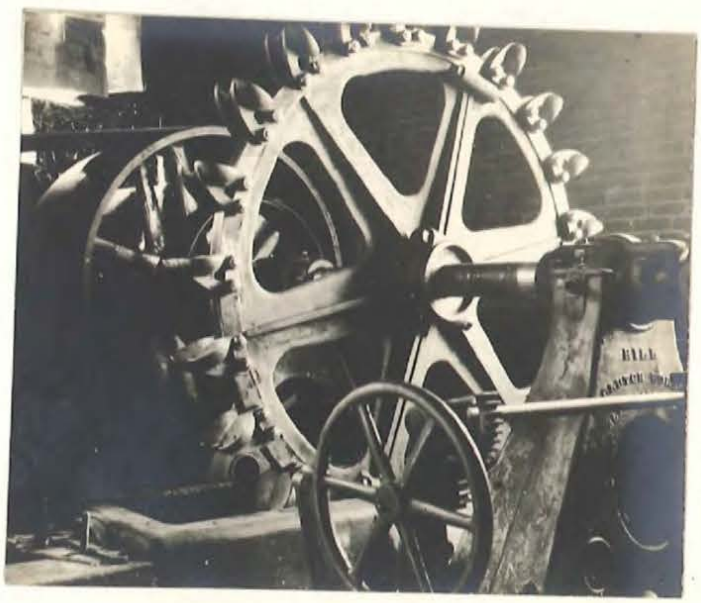
THE ROARING FORK ELECTRIC LIGHT AND POWER CO.

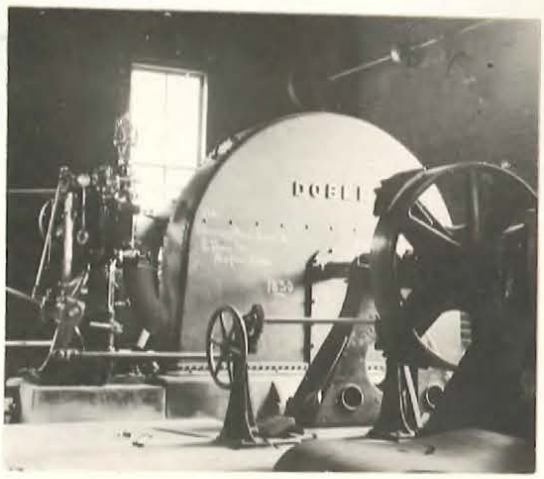
Another Generator for Castle Creek Powerhouse



THE ROARING FORK ELECTRIC LIGHT AND POWER CO.

Hunter Creek Water for Castle Creek Powerhouse





THE PENSTOCK

In the early summer of 1917, I worked with Paul Frost with his four-horse team and wagon. Our job was to distribute lengths of steel penstock pipe along the ditch in which it would be installed. Usually we loaded a length of pipe on the wagon, climbed on top of the pipe and rode up along the ditch to where we unloaded the pipe. One afternoon we were caught in a rain storm so Paul and I crawled in the pipe from which location Paul was able to drive the horses. We were surprised but not so much as Steve Finley who, from the Castle Creek Water Company's tank, had observed our outfit progressing up the hill apparently without benefit of human guidance and rushed down through the rain to see what was the matter.

Later in the same summer, I assisted in the erection of the wood-stave tanks at the upper end of the new penstock.

TANKS UNDER CONSTRUCTION
Note ditch and penstock
in center background

TANKS NEARLY COMPLETE

THE FLUME

During vacations from college in the summers of 1920-22, I worked with Henry Sievers on the Maroon Creek Flume. We replaced deteriorated wood flume with semi circular metal flume. The wood flume was made up of 12-foot lengths so we replaced 12-feet or sometimes 24-feet per day if the going was good. Our time to accomplish the work was limited to about 6- hours because in that time the water in the reservoir would be drawn down to the safe limit and the water had to be turned back in through the flume. Necessary replacement framing lumber was floated inthe flume to points near where it would be used.

One day while we were working on the flume above a beaver pond, Henry's dog started chasing a beaver. The beaver would allow the dog to get close and then dive to swim across the pond under water. Coming up on the far side, the beaver would slap the water with it's tail to attract the dog for a repeat performance. After about eight or ten trips across the pond in alternate directions, the poor dog was so exhausted that he could hardly crawl out of the water.

Maroon Dam - Flume Intake

Lumber Arriving

Work in Progress

The Roaring Fork Electric Light and Power Company.

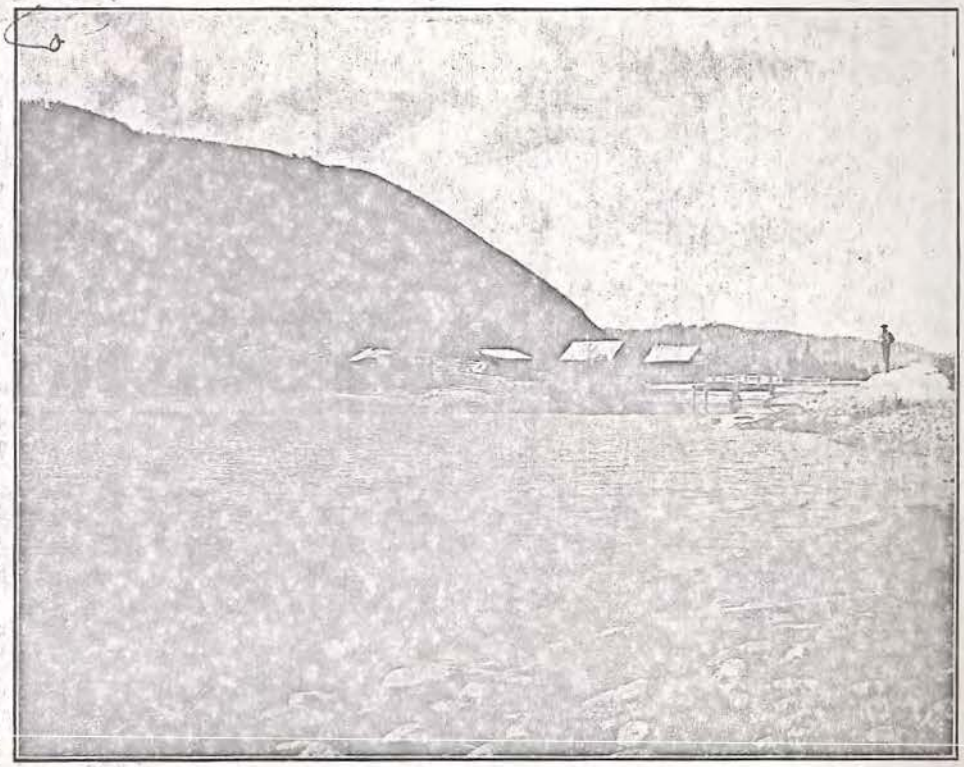
ASPEN, Colorado, was one of the pioneers in generating electricity by water power. Situated at an altitude of 8,000 feet, near the junction of several mountain streams, all of which have a rapid fall, with a demand for light and power very large in proportion to its population, Aspen led the way in the use of electricity for domestic lighting and for power in mining. For years it was the best-lighted town in the United States. It was the first mining camp to install an electric hoist, and the first to install power generators run by water power.

The Aspen Electric Company was organized in 1885, and its plant consisted of one fifty-light Brush arc dynamo. Its power was rented from the Aspen Smelting Company, one Pelton wheel running under a head of seventy feet. In 1886 the company built its own plant, a flume about half a mile long giving a head of fifty-five feet. The installation consisted of one horizontal Victor turbine, with an arc-light dynamo belted direct to a pulley on the water-wheel shaft.

In the same year, 1886, the Consumers' Light and Power Company was organized, and put up a small plant, using a Pelton water-wheel and a Brush arc-light dynamo. The power was obtained from Hunters creek, where, with a flume about 1,500 feet long, a head of 125 feet was obtained. In 1887 the two companies were consolidated in the Roaring Fork Electric Light and Power Company.

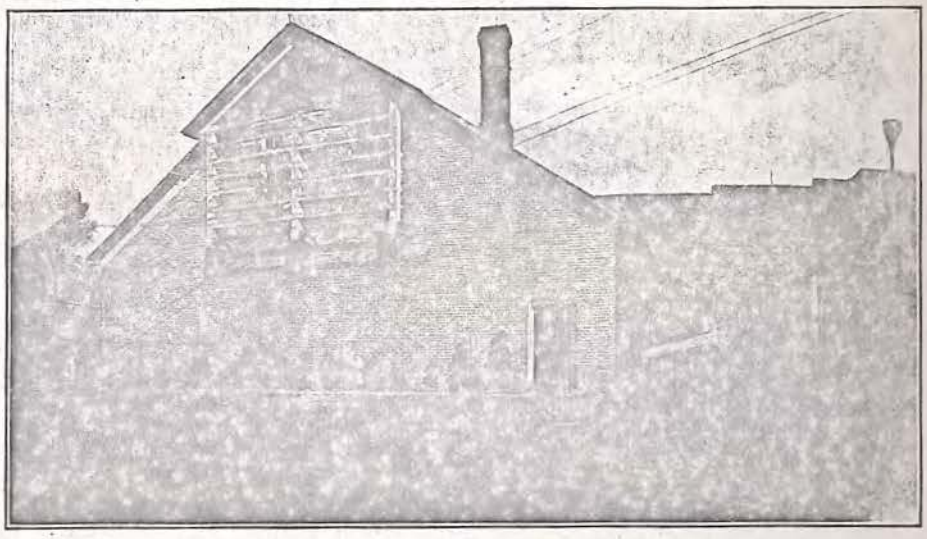
In the fall of 1887, Frank Sprague visited Aspen, and after some discussion of conditions and duty required, a contract was made with the Sprague company for a small Edison generator and a ten-horse-power hoist. This hoist was made by bolting together on a wooden frame a Sprague street-car motor and an ordinary flat friction mining hoist of small size, with an intermediate gear. This hoist, the first mine hoist operated by electricity, was installed in the Veteran tunnel, 1,000 feet from the surface, to haul empty cars up a three per cent grade.

The generator for this hoist was run by power rented from the Aspen Smelting Company, and used the same water-wheel which had been originally used by the Aspen Electric Company. As only one hoist was used, the load on the generator varied from no load to ten or twelve horse-power, and emphasized the weakness of all water-wheel governors of that day. The greater the increase in the loads the more the speed of the water-wheel was slowed, and the slower the governor opened the gate; but in spite of this drawback, the installation was an electrical and commercial success, and was visited by many mining men who had been waiting for some one to try the experiment of electrical transmission of power for mining work. The power of the combined stations being insufficient to supply the lighting demand, and power transmission having been proved a success, a survey was made and in 1888 the construction of the pioneer high-pressure plant was commenced. From Hunters creek, with a flume 8,750 feet long and 4,000 feet of pipe line, a head of 880 feet was obtained, which gave a water pressure of nearly 380 pounds. The water was diverted from Hunters creek at a point where a large storage reservoir was made by building a crib dam across the stream.



ROARING FORK ELECTRIC LIGHT AND POWER COMPANY—HUNTERS CREEK DAM.

This dam is a filled crib in granite wash. The mud sills were sunk as deep as was possible, with only a hand pump to drain the pit. The timbers were fastened together with drift holes and the crib



ROARING FORK ELECTRIC LIGHT AND POWER COMPANY—HUNTERS CREEK STATION.

filled with granite boulders. The upper face of the dam was double-boarded, with broken joints, and puddled with clay above the boards. This dam is 140 feet long, thirty feet wide on the bottom, twelve feet wide on top and twelve feet high in the centre of the stream. This dam raised the water about eight feet above ordinary water line. The flood waters scoured a pit below the dam, and this was filled with a crib loaded with stone. Except for this no repairs of consequence have been necessary, and the dam has been tight and solid. The water is carried from the dam through a flume twenty-four inches wide by eighteen inches deep. The flume is built of two-inch plank, grooved and put together with a loose tongue of seasoned lumber. The flume is built with bents four feet apart. The bents have sills four inches by six inches, posts four inches by four inches and caps two inches by six inches. The sills and caps are mortised, and the posts tenoned to fit. The flume is covered with two-inch plank and buried in the ground to protect it from frost. The flume has a grade of sixteen and one-half feet per mile, and the water flows about six feet per second. Generally the flume follows the contour of the hill side, which is graded by a side cut, so that the entire flume rests on the solid. The flume is carried across small narrow gulches on trestles. On the trestles, to protect it from the frost, the flume is carried in a box with a space of about six inches around, filled with dirt. The flume discharges into a circular tank, ten feet by ten feet, made of three-inch seasoned Michigan pine. The overflow from the tank is carried back to the creek through a flume, eight inches by twelve inches.

The pipe-line is attached to the tank by a flanged connection. The pipe-line is wrought-iron National Tube Works, converse lock joint, with cast-iron bells. It varies in thickness from No. 5 wire gauge at the top to No. 2 wire gauge at the bottom; of the latter thickness there is 2,153 feet, fourteen inches in diameter. This pipe was laid with leaded joints. The leaded joints were generally satisfactory and permitted a much less accurate alignment of the pipe than would have been necessary with flanged joints. As years went by, occasionally the lead was forced from a joint, but driving it back and clamping the pipe outside the lead effectually and permanently stopped that particular leak.

The station is sixty by forty-eight feet inside. It has a brick wall twelve feet high on a stone foundation. The roof is supported by a wooden truss and the station is entirely free from posts. A traveling crane, which can lift any armature, runs the full length of the station.

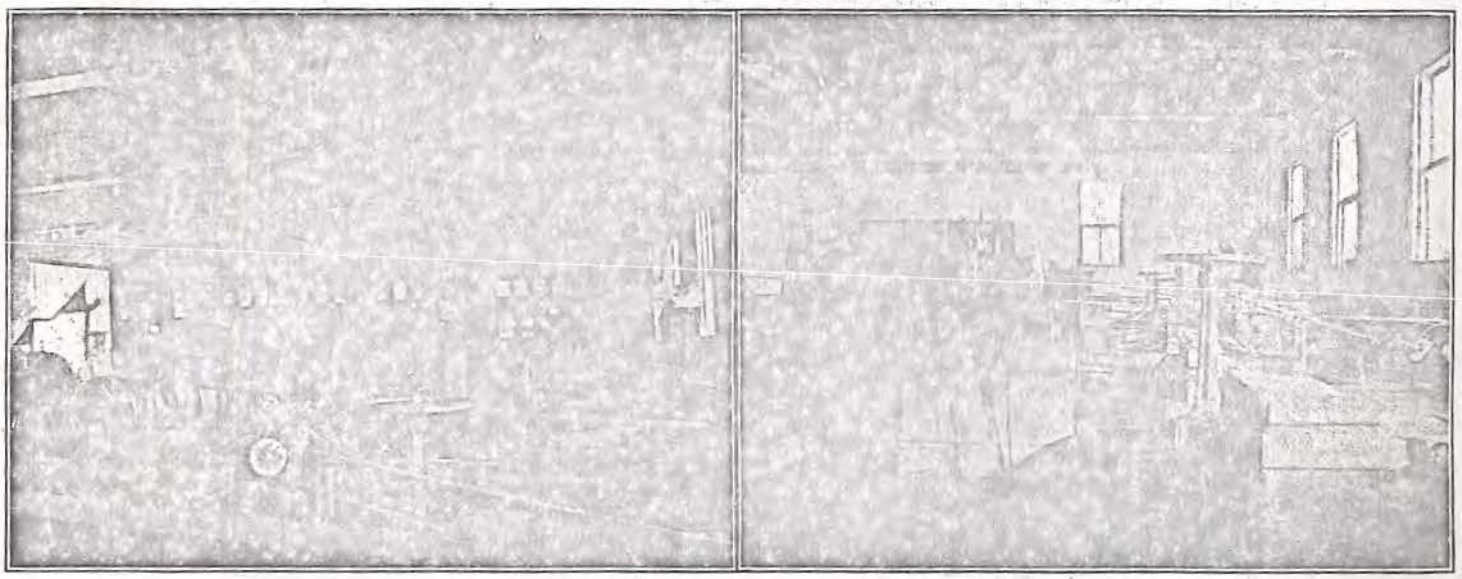
This station was equipped with nine Pelton wheels, each two feet in diameter, supplied with water through deflecting nozzles, with tips varying in size according to the power required. On account of the force of the stream under this great pressure, a curved pipe was arranged to receive the stream when the nozzle was dropped below the wheel, which gave the stream a right-angle turn, and discharged it into a waste flume running parallel to the building. To economize water, the deflecting nozzles were afterward replaced by nozzles with needle valves.

The water-wheels are arranged along the walls of the station, five on one side and four on the other. The wheels are set in stone wheel pits and covered with an iron casing, through which the shaft runs in a stuffing box. This arrangement places the wheel in the station in a water-tight cover, but is easily accessible.

The supply pipes in the station are all below the floor. The pipe joints in the station are all flanged. A distributing pipe runs along under the floor on each side of the station. Opposite each wheel a curved pipe connected to the top of the distributing pipe comes up through the floor to carry the wheel-gate and nozzle. The only defect in the installation was that the valves in the distributing pipes were not strong enough to stand the unusual pressure. They were discarded and replaced by heavy castings. The defective valves were replaced and the power started in April, 1889.

The original installation in this station consisted of two 1,150-light Brush, direct-current incandescent dynamos, three Brush dynamos, fifty arc lights each, three 1,200-light Westinghouse alternating-current dynamos, and one 100-kilowatt Edison, 550-volt power generator. The dynamos are belted direct to a pulley on the end of the water-wheel shaft.

To overcome the difficulty of maintaining constant speed under great and sudden variations of load on the power generator, C. E. Doolittle, the manager of the company, invented what is known as the Doolittle differential governor. This was the first water-wheel governor working with a speed proportionate to the change of speed in water-wheel, and under proper conditions gives very close speed regulation. As first installed, it raised or lowered the deflecting nozzle to send the full stream against the buckets if full power



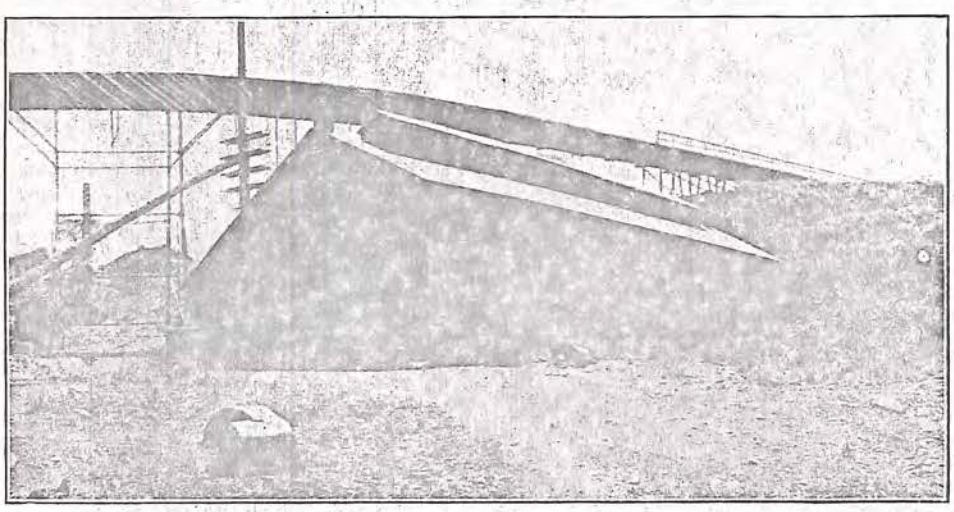
ROARING FORK ELECTRIC LIGHT AND POWER COMPANY—TWO INTERIOR VIEWS OF HUNTERS CREEK STATION.

was required, or part of the stream below the buckets if only part of the power was required.

As a reserve in case of accident, or of low water in the winter, the company in 1891 added a steam plant to the Hunters creek station. This consists of one 250-horse-power Armington & Sims engine and three tubular boilers, sixteen feet long by sixty-six inches in diameter. The water-wheel shafts on the east side of the station were replaced by larger shafting and equipped with clutches. The main shaft of the steam plant was placed in line with the water-wheel shaft, and arranged so that it could be coupled or uncoupled without stopping the water-wheels or dynamos.

In 1892, the capacity of the Hunter creek station having been reached, the company commenced the erection of a station on Castle creek, just west of the city limits of Aspen. The main building is 110 feet by thirty-six feet, with two small additions to contain the valves in the main lines, pressure regulators and relief valves.

The building, arrangement of water-wheels and shafting, pipe-line and all details of construction were designed by Mr. Doolittle, the manager of the company, who is a pioneer in hydroelectrical work, and has had many problems to work out for himself and others.

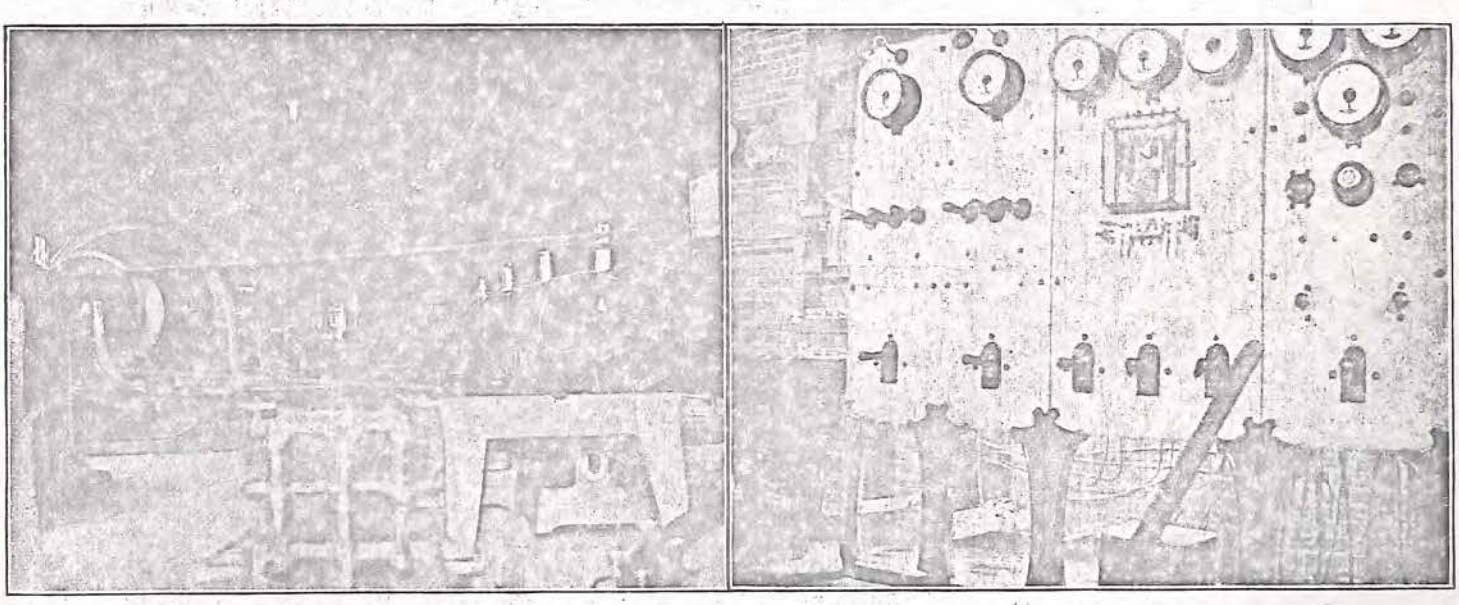


ROARING FORK ELECTRIC LIGHT AND POWER COMPANY—CASTLE CREEK STATION.

The building has stone foundations, brick walls, iron roof and cement floor, the only timber used being the door and window casing, and a timber bed for each dynamo. The roof is of Berlin Bridge Company anti-condensation, fireproof lining.

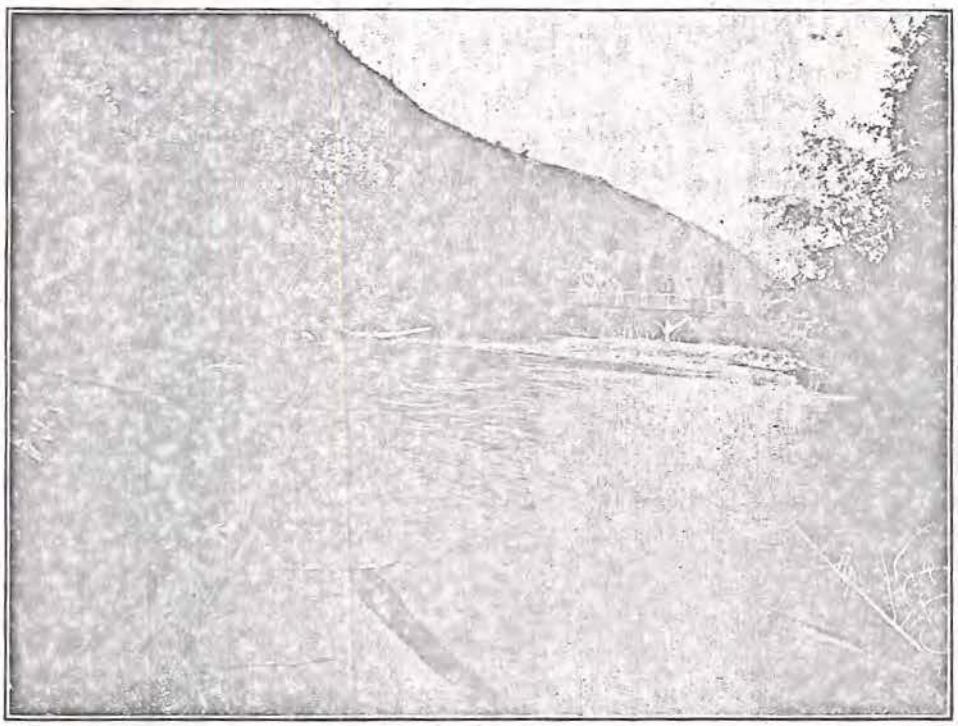
The station has a four-ton traveling crane, which runs on nine-inch beams, and spans the entire width of the building. The power is produced by five Pelton wheels in three sets, one set having one wheel, the others two wheels each, and each wheel having two nozzles. The wheels are enclosed in wheel cases, which are a combination of masonry and cast iron, with stuffing boxes around the shaft, so that while the wheels are in the station the water is confined to the wheel case. The shafting is in one line and is carried on adjustable pillow blocks set on masonry piers. The shafting is so arranged with clutches and clutch pulleys that any part of the line shaft or any pulley can be released. The nozzles supplying the wheels were originally equipped with butterfly valves, and the governor actuated all four in a set at the same time. This arrangement was replaced by a mechanism designed by Mr. Doolittle, in which the butterfly valves were replaced by gates over the end of the nozzle, and these gates were opened or closed in rotation. In this way only one jet was broken at a time, and a great saving in water accomplished. These nozzles were supplanted by needle valves.

The Castle creek station has two independent supplies of water. From the Midland flume on Castle creek with a head of 350 feet, and from the Maroon flume on Maroon creek with a head of 364 feet. The pipe-lines from the two flumes are cross connected in the station, so that any wheel can be run from either pipe-line. The water from the Midland flume is supplied through 3,995 feet of riveted pipe from twenty-two to twenty-six inches in diameter, made of from No. 10 to No. 14 steel, all seams double-riveted and all pipe dipped in coal tar. This pipe-line has a capacity of 1,000 cubic feet per minute, with a loss of head of eighteen and five-tenths feet, giving 500 effective horse-power. The Maroon pipe-line is 3,905 feet long, from twenty-six inches to



ROARING FORK ELECTRIC LIGHT AND POWER COMPANY—CASTLE CREEK STATION—VIEWS OF MACHINES AND SWITCHBOARD.

thirty-two inches in diameter, and made of from No. 8 to No. 12 steel, double-riveted and dipped. This line will carry 1,500 cubic feet of water per minute with a loss of head of fifteen and five-tenths feet and will give 750 effective horse power.



ROARING FORK ELECTRIC LIGHT AND POWER COMPANY—MAROON CREEK DAM.

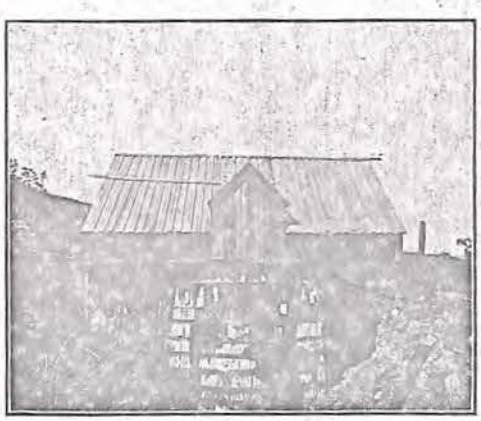
Each pipe-line has in the station an escape valve set to open at the standing pressure of the line, and a pressure regulator or pressure box, which is an iron cylinder connected directly to the pipe-line, and nearly filled with compressed air at the normal pressure of the line. Their joint office is to relieve the shock from water-hammer due to the sudden closing of a valve.

The Midland flume is 10,153 feet long, three and one-half feet wide and two feet eight inches deep, built of two-inch red spruce plank, covered with plank and buried in the ground. The Maroon flume is 15,600 feet long, four feet wide, three feet two inches deep, built of red spruce and covered with earth.

Each flume discharges into and each pipe-line is connected with a tank thirty feet in diameter and twenty feet deep. These tanks are made of three-inch Michigan pine, and have each a capacity of approximately 100,000 gallons.

As a reserve, in case the water was temporarily stopped by snow slides or other causes, the company in 1894 built a reservoir which is on the level of and connected with the tank at the head of the Maroon pipe-line. This reservoir has a capacity of 10,000 horse-power hours. It was built in a small depression, the upper end of which was near the Maroon tank. First, all the surface soil was washed away by ground sluicing with water from the flume. Then a crib dam thirty feet high was built across the lower end, and a connection made at the upper end on a level with the bottom of the tank. The water at all times stands at the same level as the water in the tank. The dam was double-planked and puddled with clay over the lower ends of the plank.

The original installation in the Castle creek station consisted of three 160-kilowatt, 550-volt Brush direct-current generators. Later the Brush arc dynamos were moved to this station, and in 1904 replaced by one 200-kilowatt Westinghouse generator, and all the series arc lights were replaced by alternating-current enclosed arcs. Two 200-kilowatt General Electric direct-current, 550-volt generators have been added to the power plant.



ROARING FORK ELECTRIC LIGHT AND POWER COMPANY—MAROON CREEK TANK.

The power installation was commenced before alternating-current motors were developed, and while not in accordance with more modern methods has worked very satisfactorily. A large percentage of the power has to be distributed underground, in some cases two miles from the surface, and a 550-volt direct current has proved safe and satisfactory.

There is one main pole-line from the Castle creek station. The poles are red spruce, fifty feet long, not less than seven inches in diameter at the top, and not less than twelve inches six feet from the butt. The poles are set six feet in the ground, and are approximately sixty feet apart. The line was designed to carry thirty-two 0000 wires.

The office, all the stations, dams and tanks are connected by telephones. In the flumes are floats electrically connected and arranged to signal the stations if the flow of water falls below the normal.

Electricity is supplied to about twenty different mines and mills in units varying from ten to 125 horse-power. The power is used for hoisting, concentrating and sampling.

Technical Publicity Association.

The Technical Publicity Association devoted its meeting of December 20, at the Aldine Association rooms, 111 Fifth avenue, New York city, to the subject of "The Value of Circulars and Printed Matter." Frank Vreeland, art editor of the *American Printer,* spoke of the commercial value of beauty in typography, and Walter Gilliss, president of the Gilliss Press, New York, made some remarks about limited editions.

The companies represented at the dinner by members of the association—which is confined to those connected with the advertising departments of machinery manufacturing industries—were as follows: Ingersoll-Rand Company, F. R. Almond Manufacturing Company, Pope Manufacturing Company, H. W. Johns-Manville Company, Yale & Towne Manufacturing Company, John A. Roebling's Sons Company, American Locomotive Company, General Electric Company, Patterson, Gottfried & Hunter, New York Edison Company, M. H. Treadwell Company, Crocker-Wheeler Company, A. S. Cameron Steam Pump Works, and Lidgerwood Manufacturing Company.

The meeting developed into an "experience meeting" and many of the members told of their methods and results with printed matter and circular letters As usual at the monthly meetings, several new members were elected.

NEW YORK
35 Nassau Street
Phone Cortland 7331

MINING AND ENGINEERING WORLD

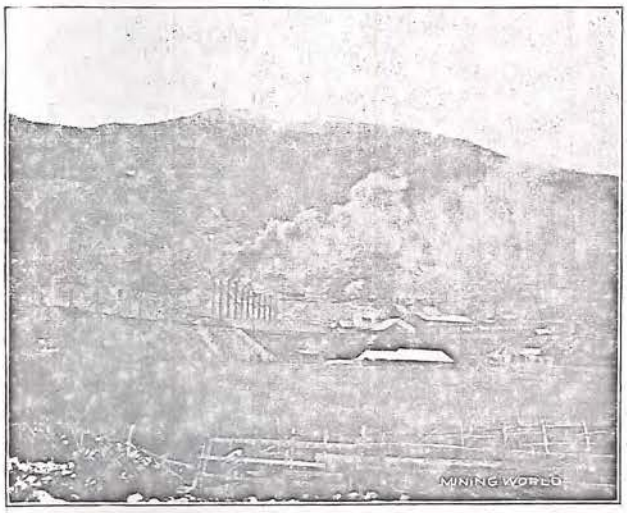
DENVER
403 First National
Bank Building

No. 23. Vol. 45. CHICAGO December 2, 1916.

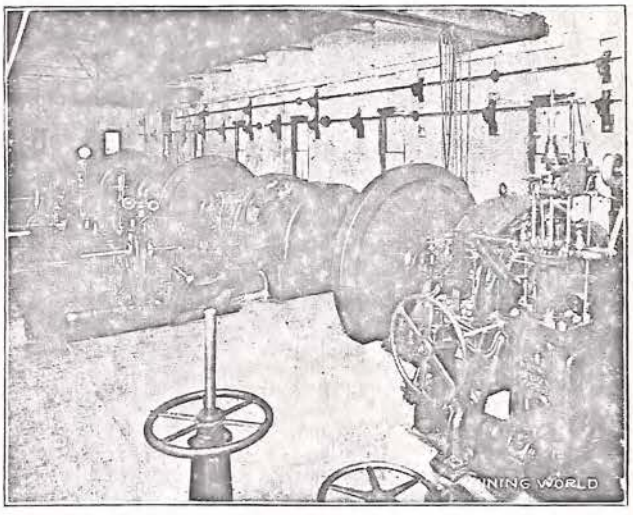
Aspen, Over the Range in Pitkin County, Colorado

W. A. ROOT.

The days of the excitement and advent into the Black Hills of South Dakota and to Leadville, during 1876, and from that time on for several years, will long be remembered, and in fact, are a portion of the historical records of mining districts and mine development. About the time of the wild excitement over mineral discoveries in the Black Hills there was much seeking for gold by sluicing and other primitive methods in California gulch, the waters of which, a tributary to those of the Arkansas river, whose real source were only a few miles away and near to the summit of the Continental divide.



SMUGGLER AND MOLLIE GIBSON MINES.



INTERIOR ROARING FORK ELECTRIC PLANT, ASPEN, COLO.

The finding of boulders largely composed of carbonate of lead and silver while working the dirt of the bed and channel of California gulch caused the prospecting for ledges, leads or bodies of ores on the hillsides above the gulch. Among the first discoveries were those of the Galligher Bros., and the sale of their locations for something above $100,000 was soon heralded abroad, causing the influx into the district of thousands, embracing all classes, many of whom were prospectors and miners from almost every known mining district.

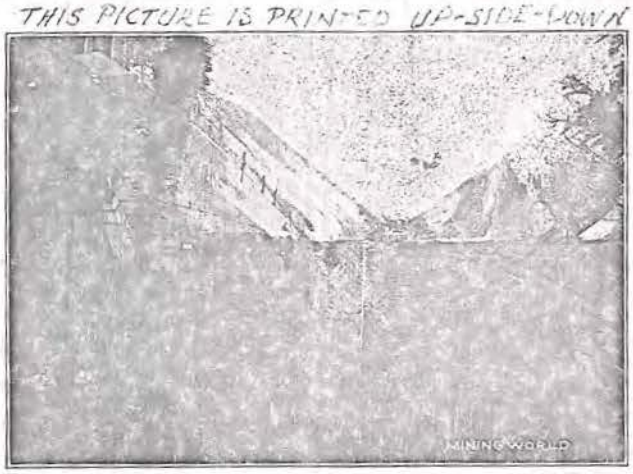
It is not my purpose to enter into detail of the wonderful history of that world renowned camp—Leadville—of the naming of it, nor of the enormous fortunes realized and afterward scattered broadcast over the land. The story of Leadville's remarkable days is now before the public in a neat volume by C. C. Davis, of Los Angeles, for many years a resident of Leadville.

"On to Colorado," "On to Pike's Peak or Bust," were painted or draped on the bull-whacking trains crossing the plains in 1859, and into the 60s, and so in the days of Leadville in 1879, upon hundreds of freight wagons and other vehicles could be seen the nearness of the old inscription, "On to Gunnison," "Gunnison or Bust," and so during that year every canyon and gulch on the eastern slope of the Rocky mountains from the headwaters of Arkansas down to the mining camp of Salida, were filled with prospectors and seekers after mineral wealth; and the same of the western slope.

The peculiar character of the earth's formation at Leadville was seemingly unknown, and caused much study of Hayden's Atlas, so much so that old-time gold seekers in granite formation left the gold-bearing sections to hunt for that of a salurian, namely, when the

ores, silver and lead-bearing, would be found in deposits forming a contact between lime, porphyry or quartzite.

The prospectors who made their way into the Roaring Fork district and discovered the Smuggler, Mollie Gibson and Della S. upon one side of the Roaring Fork river, and the Spar, Durant, Emma, Vallejo, Broadway and others on Aspen mountain, came mostly from Buena Vista over Cotton Wood pass, through Union and Taylor parks, over Elk Mountain spur, and then down Castle creek. A few did get over Independence pass at head of Lake creek above Twin lakes. In February and March, 1880, nearly every claim in the district was bonded for goodly sums to eastern men of means, and from the money expended by them and others, the big mines of the district were developed. The years from 1887 till 1892 were prolific for nearly every one who came to Aspen seeking fortunes,



HOPE LEASING CO.'S TUNNEL, ASPEN, COLO.

and undoubtedly, only for the demonitization of silver, Aspen would be a city of many thousands today. The mining men who have remained at Aspen are possessed of much abiding faith and contend that with proper underground developments millions of silver, lead and zinc values can be mined from the interior of Aspen mountains.

The Smuggler Leasing Co.

This company, with David M. Hyman of New York, president; Edwin M. Rogers of New York, vice-president and consulting engineer, and C. E. Anderson, superintendent, was organized in 1911, and at once took over the Smuggler and Durant mines, the latter on Aspen mountain; afterward leasing the Mollie Gibson, Della S., Bushwhacker, Mineral Farm, Park Regent and Argenta. The identity of the Mollie Gibson is absorbed with that of the Smuggler. The greater portion of the regular production comes from the shaft of the Della S., amounting to about 400 tons every 24 hours, while that of the few leasers is hoisted from the Smuggler. The values are in lead and silver, the former 78% and a few ounces of silver. The greatest depth of the workings are on the 18th level at 1600 ft. below the surface, with greater portion of the ore mined on the 15th, and exploitation constantly below the 13th level to the 18th. On the 15th level are five Aldrich Queen duplex electric pumps, each of 200 hp., and on the 18th, two Aldrich electric pumps, and with the other pumps about the mine, together raise 3000 gpm., causing the drainage of a very large area. All electric power is furnished by the Roaring Fork Electric Light & Power Co.

The Wet Concentrating Plant.

The Houghton and Harding mill on the Roaring fork, in close proximity to the Smuggler mine, is equipped with a Dodge crusher, three sets of rolls, 10 sets of 4-compartment jigs of the crank arm type, originally manufactured in Germany. The motion is an accelerated one, with a quick down stroke and of a slow return, with force from the plunger. There are 7 Wilfleys and 6 Frues on primary feed, and 8 Frues and 12 Wilfleys on regrinding the tailings, making 19 Wilfleys and 14 Frues in the mill. About 90% of the 400 tons of ores treated come from the Smuggler, and the other 10% from leasers on the Durant. All machinery and electric lights are run by power from the Roaring Fork Electric Light & Power Co.

The Durant Compressor.

At the base of mountain above Aspen is situated the 80-hp. Norwalk compressor and 80-hp. boiler with a Leyner tool sharpener. At the shaft of the Durant, several hundred feet up the mountain, is a 130-hp. hoist and a 65-hp. motor. The shaft is double compartment, with the double and single deck cars working tandem. The ore is sent down to cars by aerial tram, and then hauled to the mill. The compressor furnishes air for 10 miles of underground workings in Aspen mountains, and also for the air drills in use. Chas. O. Kane is in charge.

The Roaring Fork Electric Light & Power Co.

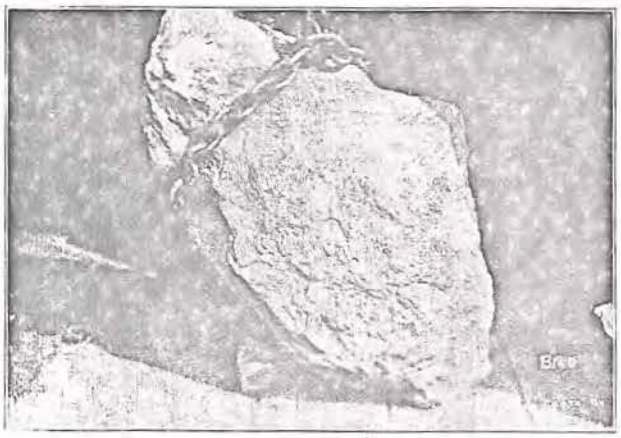
The plant of this company is located west of the town line and is of much importance, furnishing water, light and power for everything in and about Aspen—the mountain, the mines and the mill. The reservoirs are on Castle and Hunter creeks and its pipes and flumes extend for miles.

The power plant has three 400-kw. and two 200-kw generators, each generator having in one end of shaft a Pelton-Doble tangential water wheel, and on the other end of the shaft, a heavy cast steel flywheel of 105 ins. in diameter. The generators are direct-current machines, 600-volt, operated two in series on a 600 to 1200 volt, 3 wire system; distance of transmission is 1 to 2 miles. David R. C. Brown, for nearly 20 years connected with Aspen enterprises, is president; C. F. Brown is secretary and C. E. Doolittle, manager.

Hope Mining, Milling & Leasing Co.

One of the greatest of propositions put forth in the Roaring Fork mining district, and with many good

signs of ultimate success, was the organization of the Hope Mining, Milling & Leasing Co. Its principal stockholders are residents of the Roaring Fork valley, and no salary or compensation is paid to any officer or director acting in official capacity. Besides the ownership of four full claims, several fractions and a mill site, it has secured a lease on the Little Annie and other propositions, controlling an area of 400 acres. Equipment consists of a compressor plant consisting of an 80-hp. boiler, a 4-drill air compressor, blacksmith shop and a ventilating plant, the power for which is obtained from utilizing the water flowing from the Famous tunnel. The physical condition of the property improves with the advancement of the tunnel toward the vein of the Little Annie mine, the reaching of which is the object of driving the tunnel. The tunnel known as the Famous is in about 6000 ft., and will cut the vein at about 1100 ft. further in. In



MOLLIE GIBSON'S SILVER NUGGET, WEIGHING 1840 LBS.

driving the tunnel, ore of high grade has been met with.

The Little Annie mine is expected to be the great proposition of the Hope Co., especially when the Famous tunnel reaches the vein at a point 1500 ft. below the surface. The property is located on the Castle creek fault, and its workings are in porphyry and shale on the west side of the fault, and it also crosses the fault into silurian-dolomite. On the lower levels the ore is a sulphide of lead, zinc and silver, with a considerable amount of barite. The galena is sometimes beautifully crystallized, and the silver is often found native. The first section of 250 ft. in the 2250 ft. on the dip produced more than $7,000,000, and if the future undertakings of the present organization prove successful, the production will reach millions more in silver, lead, zinc, and probably much copper.

The officials of the company are Charles O'Kane, president; H. W. Clark, secretary, and J. B. Stitzer, treasurer.

The West Contact.

It can be surmised that two contacts exist in general formation of the Roaring Fork mining district, and that they are separated by several hundred feet of short lime. All these properties owned by and under lease to the Smuggler Leasing Co. are in the eastern contact, while the west contact takes in the Copperopolis, Jute Smith, Ducey and Monarch claims. Passing south there are the Great Pacific, Keystone, Mayflower, Saddle Rock group, and still further south occur the Morning and Evening Star, New York and Queens Gulch group. A tunnel driven 1200 ft. along the contact from this group opens up rich bodies of ore. The objective point of this tunnel is to reach ore bodies of the Midnight and other claims. Development for a distance of 3 miles or more shows there is an east and west contact of the ore zone of the district. The values are mostly silver-lead, while part of the west contact produces considerable zinc. The Saddle Rock, Jute Smith and Copperopolis group, under management of Capt. Geo. W. Thatcher, with $150,000 expended in development, produced ore shipments to the amount of $500,000. He asserts from developments of the next 2 years the product will amount in value to a far greater sum.

Exports of Non-Ferrous Metals.

Exports of non-ferrous metals for 8 months ended in August were $412,140,072 in 1916, against $136,397,922 in 1915, and $105,386,742 in 1914. The average rate of export in 8 months of 1916 has been four times corresponding figures of 1914, a representative year just before the war. Brass and brass manufactures were $203,097,551 in 8 months of 1916, or eight times the figures of 1914.

Exports of copper group in 1916 have increased in value 64% over corresponding figures of 1914. Zinc and zinc manufactures exports were more than 50 times figures for 1914, and aluminum and manufactures nearly 10 times. Exports of 6 principal non-ferrous metals compare for 8 months ended August:

	1916.	1915.	1914.
Brass and manufactures	$203,097,551	$ 26,602,575	$ 4,559,204
Copper and manufactures	148,163,887	74,344,509	89,713,158
Zinc	36,172,790	18,270,512	698,512
Lead and manufactures	10,701,465	6,865,205	3,524,337
Nickel and manufactures	7,817,061	7,635,651	6,249,378
Aluminum and manufactures	6,187,318	2,678,770	642,153
Total	$412,140,072	$136,397,922	$105,386,742

Average export prices show considerable differences in degree of inflation. Average export price of copper for 8 months of 1916 was 26 cts., and for same periods of 1915 16 cts., and of 1914 14 cts. Prices of brass bars as averaged were 29 cts. in 1916, 17 in 1915, and 14 in 1914. Figures for nickel were 39 cts., 38 and 32 for 1916, 1915 and 1914. Lead average prices were 6.7 cts. for 1916, 4.3 cts. in 1915 and 3.9 in 1914. Average advance in prices for first 8 months of 1916 over 1914 comparison for copper, brass, nickel and lead was 72%.

By a special process of annealing, toughness and malleability may be developed to a remarkable degree in white cast iron. In this way castings are made to answer for forgings in many cases.

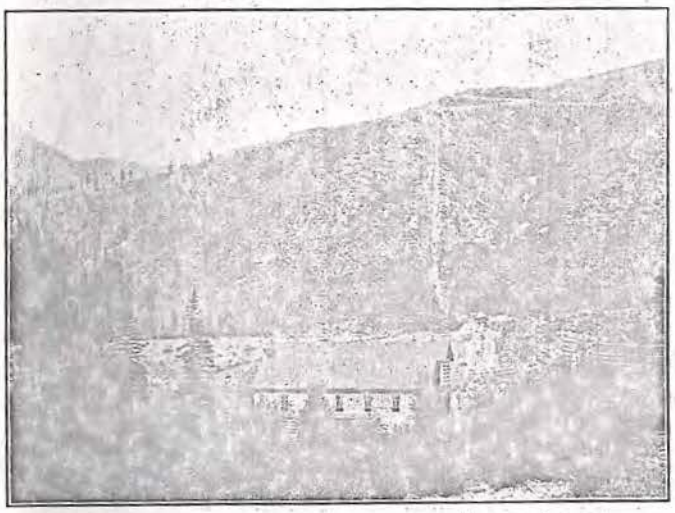
25

THE FIRST HYDROELECTRIC PLANT IN AMERICA

BY C. E. DOOLITTLE

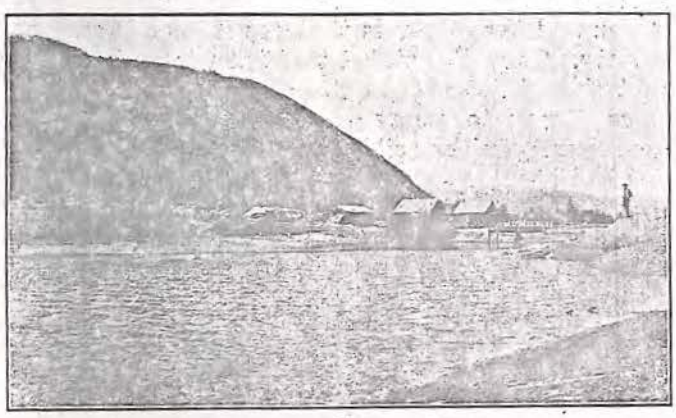
(The little town of Aspen was perhaps the first in America to have its dwelling houses as well as its streets and business houses lighted by electricity from water power. The first application of electric power to mines was undoubtedly made here. The problem of controlling the speed of a water wheel under great instantaneous load changes was first solved at the Roaring Fork Plant and the record for high head (876 ft.) for the year 1888 was probably held by their pipe line. The author was the engineer in charge of the first installation and is now general manager of the company.—The Editor.)

In 1885 The Aspen Electric Company installed at the old smelter of The Aspen Mining and Smelting Company a 60 light Brush arc dynamo belted to a Pelton wheel under 70 feet head. The arc lights were used in the streets and business houses of the town. In 1886 this company constructed a small water power plant, using a Victor turbine under 55 feet head. In the same year The Consumer's Electric Light and Power Company put in a small plant having a Pelton wheel under 125 feet head and two 60 light Brush arc machines. In the spring of 1887 the two companies were consolidated in The Roaring Fork Electric Light and Power Company and two 40 kw. generators for incandescent lighting were installed. These were operated on the Edison 3-wire system. In the fall of that year Frank J. Sprague visited Aspen and tried to persuade the various mine managers to introduce electric power in their mines —especially for underground hoisting. None of the mine managers would take a chance, but J. H. Devereux, a mining engineer, at that time manager and one of the owners of the Roaring Fork Electric Light and Power Company, made a contract with Mr. Sprague for a 45 kw. bi-polar, 500 volt generator, and a 10 h.p. electric hoist. The hoist consisted of a Sprague street car motor, geared to an intermediate shaft which was connected to the hoist drum through a flat friction drive. The generator was belt driven from a Pelton wheel, and the speed controlled by a Woodward water wheel governor. The hoist was installed in the Veteran Tunnel, 1000 feet underground, and was started in July, 1887. (This hoist is still in use but with another motor.) Two other hoists were added almost at once,—one in The Aspen mine, the other in The Regent mine. The speed of the water wheels varied greatly, but nevertheless the hoists were a great success.



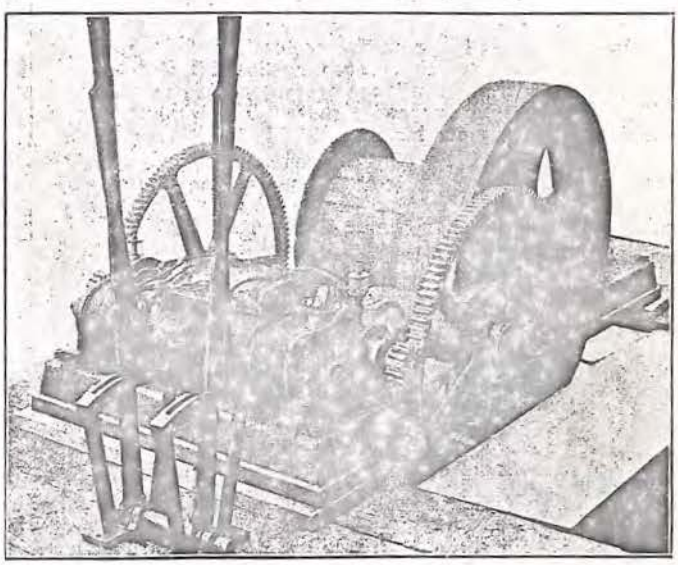
HUNTER'S CREEK POWER HOUSE AND PIPE LINE

This was built in 1888 and ranks as the pioneer high pressure power plant. From Hunter's Creek a flume 8,750 ft. long and 4,000 ft. of pipe line (shown in the background) furnished a head of 876 ft. This was the record for its time and the object of many pilgrimages among mining and electrical men. The pipe was a 14 in. lap-welded, wrought iron pipe with leaded joints and is still in use, having been extended a mile to the Castle Creek power house where the water from this pipe line is still producing 500 h.p.



HUNTER CREEK RESERVOIR BUILT IN 1888

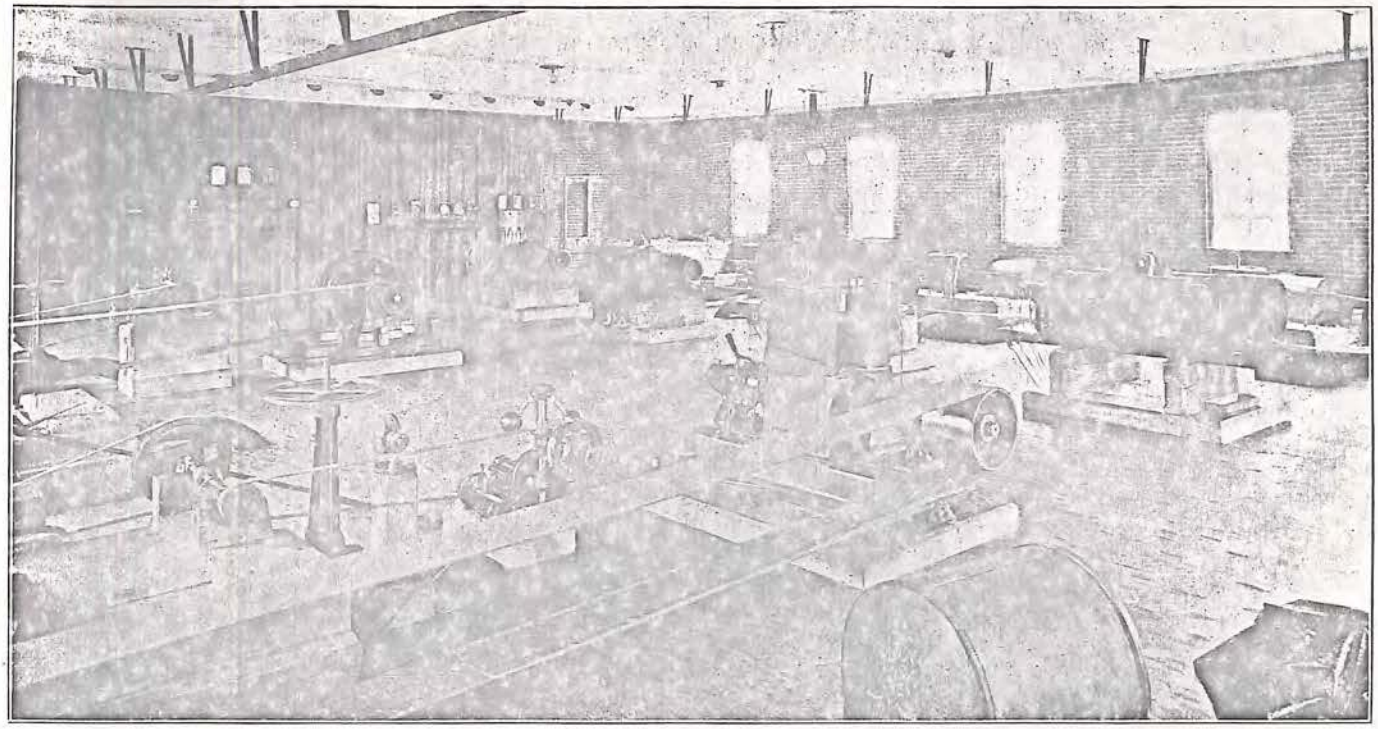
The Aspen Electric Company was organized in 1885 with one 50 light, Brush arc dynamo, and gradually added to its plant as needs grew until in 1888 the Hunter's Creek power house was built. The dam is a filled crib in granite wash. The mud sills were sunk as deep as was possible with only a hand pump to drain the pit. Except for one repair necessitated by a flood, the dam has been tight and solid.



ONE OF THE ORIGINAL HOISTS

This electric hoist was installed in 1887 and was made by bolting together on a wooden frame a Sprague street car motor and an ordinary mining hoist of small size. This was probably the first electrically operated mine hoist in existence.

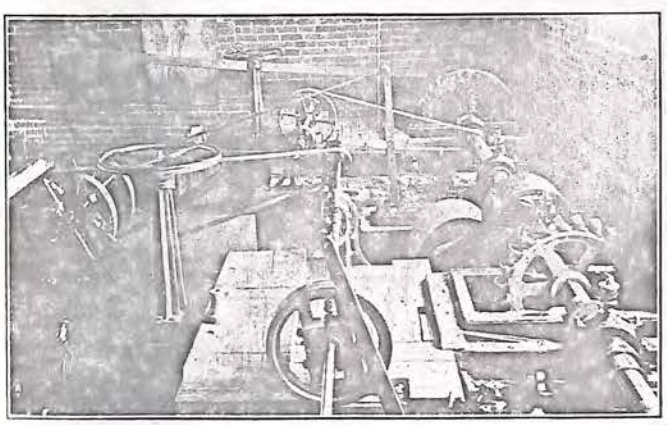
The three small water powers then in use were soon fully loaded, and during the winter of 1888-89 the electric company built a new 500 h.p. hydroelectric plant, using Pelton wheels under 876 feet head. As soon as this power was available a 25 h.p. hoist



INTERIOR HUNTER CREEK POWER HOUSE

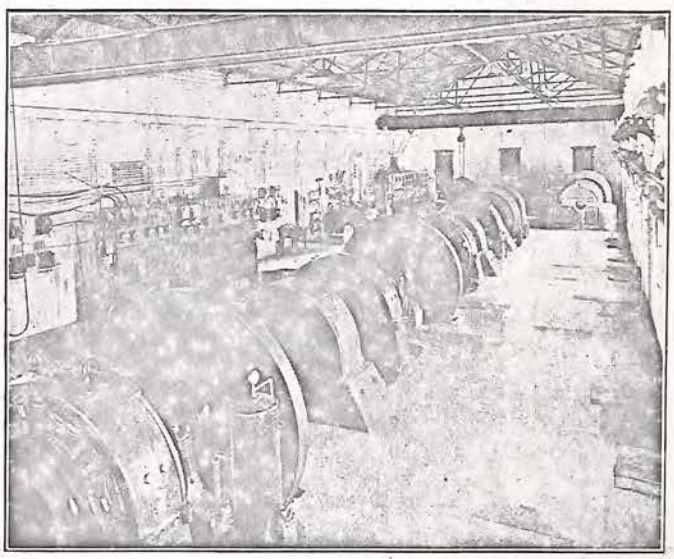
Pictures of the three small power plants which preceded it are not available but this plant itself ranks among the earliest in the country, having been built in 1888. The station was equipped with 9 Pelton wheels each 2 ft. in diameter, supplied with water through deflecting nozzles, with tips varying in size according to the power required.

was added. When this hoist was thrown on the line the water wheel and generator came to a dead stop. This difficulty was overcome, temporarily, by constructing an iron wire resistance coil near the hoist, and arranging the starting switch so that when the switch was thrown one way the hoist was thrown on and the coil off; moving the switch the other way would stop the hoist and put the coil in circuit, thus keeping the load approximately constant and resulting in a great improvement in speed regulation. But there was, of course, a great waste of energy. The mine people were glad to have the heat from the coil to warm the underground hoisting room, but the electric company naturally wished to sell the energy to some other mine, and to take full advantage of the intermittent load due to the various hoists. It was up to the electric company to invent a water wheel governor which would maintain approximately constant speed under great instantaneous changes in load. At the suggestion of W. B. Devereux, we first tried a hydraulic governor, which was the same, as far as it went, as the water wheel governors now in universal use. We had no anti-racing device, and the servo-motor was operated by water from the



AN EARLY INSTALLATION

The wheel in the foreground was used to drive a Westinghouse alternator carrying a load consisting of incandescent lamps. This load varied so gradually that it was easy to maintain the speed nearly constant either by hand or by an old style Woodward governor. The wheel in the corner drove a 100 kw. Edison bi-polar 500 volt generator supplying power for a number of electric hoists. The changes in load were sudden and great. The pulleys of the differential governor were belted one to each of the water wheels, and when the speed of the power generator varied, due to a sudden change in the load, the shaft carrying the loose pulleys and differential gear would revolve and control the supply of water to the wheel having the hoist load, keeping its speed approximately constant. The rate at which the governor acts is proportional to the difference in speed between the two water wheels; that is, it works quickly for a large change in load and slowly for a small change.



THE INTERIOR OF THE CASTLE CREEK POWER HOUSE

This was a further addition to the system built in 1892. Originally the power was produced by five Pelton wheels in three sets and was the very latest of its time in equipment. It has since been remodeled and reconstructed and now contains 4-400 kw. and 2-200 kw., 600 v., d.c. units, each connected to a Doble water wheel.

pressure pipe, instead of by oil under air pressure. We used this governor for six months, but the troubles from racing and from particles of leaves, etc., getting into the regulating valve, made it unsatisfactory. The writer then invented the so-called "Doolittle differential governor," which was a success from the start and was used in our power plants for more than twenty years.

In 1892 the power company was again in need of more power, and another hydroelectric plant was built. This power house contained at first four 200 kw. generators and a number of arc lighting machines, all belt driven from a line shaft, divided into five sections by friction clutch couplings, and having five Pelton wheels. This plant has been reconstructed and enlarged so that it now contains four 400 kw. and two 200 kw. generators for mine power, each having mounted on one end of its shaft a Doble wheel, and on the other end, a cast steel flywheel. There are also two 200 kw. generators, belt-driven from Doble wheels, used for lighting the city of Aspen and adjacent mines.

SELLING ARGUMENTS FOR SOCKET APPLIANCES

BY MAE SAVELL CROY

(Selling arguments for electrical appliances which appeal to women — as reported by a woman in "Contact." Every woman wants to know how the thing works and what it will do for her — here are a few of the answers.—The Editor.)

As a woman who uses them, and appreciates their true worth, I give here a few details of what the most essential labor-saving devices will do for women. In each case I refer to the medium, or family size:

The Washing Machine

What It Will Do	What It Will Save
Wash six sheets in 20 minutes, or the equivalent in small pieces; Wash blankets and rugs; Wash all fine laces without damaging them; By means of the electric wringer, drying the clothes almost dry; Boil the clothes in the washing machine.	The wear and tear from rubbing the clothes on the rubbing board; Laundry bills for all flat work as well as for blankets and other heavy articles; Clothing from being ruined by careless laundries; Children from contagious diseases often brought home in the clothes; A woman's back, and perhaps a doctor's bill for internal injury.

This machine will pay for itself in a family of five in approximately two years; the cost of operation is 2 cents per hour.

The Ironing Machine

Iron the bulk of the ironing, including all flat pieces, such as table linen, bed linen, curtains, men's shirts, collars and cuffs, aprons, petticoats that are not too much ruffled, rompers, etc. Four hours' ironing in one hour's time; Give a finish to linens that it would require a double ironing by hand to acquire; Press trousers.	A woman's back and feet and arms; Over-fatigue in hot weather; Laundry bills; Clothing from hard treatment at the laundry.

This machine will pay for itself in an actual saving of money in from two to three years. The cost of operation is 2 cents per hour. The cost of heating the machine is no greater than the cost of heating the old-fashioned irons, as none of the heat goes to waste.

The Electric Iron

Finish the ironing not done on the ironing machine, such as ruffles, shirtwaists, small yokes.	Many steps to and from the stove for irons; Heat from going to waste; At least one-third of the time for doing the work.

It costs no more to use an electric iron than to use the old-fashioned flatirons heated over the gas stove, unless one is deliberately careless.

The Vacuum Cleaner

What It Will Do	What It Will Save
Remove surface dirt and dust from carpets; Free from dust draperies, upholstered furniture and clothing; In addition to the above accomplishments, the cleaner with the motor-driven brush will shake the carpet and loosen the imbedded sand and grit which is then sucked up into the bag, pick up hair, lint and threads from the carpet and raise the nap of the carpet, renewing the brightness.	Having to clean so frequently, as there is no dust flying over the room to settle again; The throat and lungs of the one who is cleaning from being coated with dust; The hair, complexion and hands from being made grimy with dirt and dust; The wear and tear usually attendant on the one who has to sweep; Laundry bills, inasmuch as sweeping is no longer a dirty job.

The Electric Sew-Motor

Relieve a woman of all strain of operating a sewing-machine; Permit the prospective mother to sew without danger of injury; Enable one to do a morning's work in an hour; Sew as fast or as slowly as desired.	One-third the cost of clothing, inasmuch as clothes made at home will last three times as long as those purchased at the same price; A woman's back and legs; and with reference to the prospective mother, a doctor's bill and perhaps a life—or two of them.

The Dishwashing Machine

Wash dishes for six persons for a 5-course dinner in three minutes; Thoroughly clean the dishes, including egg cups; Wash vegetables.	Putting the hands in hot, greasy dishwater; The breaking of dishes; An hour's time three times a day, or twenty-one times a week, in a family of six; The drying of dishes.

The Electric Fan

Drive out the flies; Dry fruits and vegetables and keep the room cool at the same time; Keep the baby cool on hot days and thereby prevent summer illnesses.	Diseases that flies transmit; Fruits and vegetables that otherwise might be allowed to go to waste; Perhaps a doctor's bill.

The Electric Range

Cook the dinner while you are keeping the baby out of doors in the fresh air; or while you are down town shopping; Bake, roast, boil and stew; Impart a very superior flavor to foods; Relieve you of all thought of danger from fire while your food is cooking.	One-third of your gas bill; Fatigue from standing over a hot stove; Food from being spoiled by burning; Since meat deteriorates 25 per cent in weight when cooked in the ordinary oven, and only 8 per cent when cooked in the electric range, 17 per cent will be saved by using the electric range.