Study of the Geology in the Vicinity of Virginia City.

The vein another was found to be quartz on one side of which was found bone and another hanging wall and a quartz foot wall.

Bayer Homestake Bate Andrite

A tunnel was driven was driven into the Bate 1000' from the quartz vein and no values were found.

This the quartz outcrop was followed to the Hollow Mine and the same inspected.

At the Hollow Mine they are working a vein of crumbled quartz which is of very low grade, the average about 53.50 per ton.

The mine is worked as an open cut.

The hillsides being leveled the ground turned underground. The broken material being shipped into the chutes flowing from chute to a large grass roofed and flowing into gars at the base.

The large boulders are bulldozed or moved slipped before being shovelled into the chute.

In this mine some altered Andrite or Andrite which is partially replaced by quartz was found. The altered material being much richer than the unaltered mining to places as high as $70.00 to $70.
They are working one shift of 8 hours at the mine.
Average per man 1-8 cans of ore
or...
11 cards go and waste.
Cost of mining $0.85 per ton.
Our average 1600 lbs.
No. 2 Dupont Dynamite and 1½" X 8
50 lbs. to box.
The dip and strike of the outcrop were
measured near the Chotlar mine and
found to be:
* strike N 10° W
* dip 52°

Average strike along outcrop 3° 16° W
Average dip 50° - 60°

At one place along the strike we found
a good example of shearing planes.

We might expect to find mineralization
here.
In another place we found Arrows
in dacite

Another example.
1926/11
C & C Mine

One large shaft - Three compact
Four sections for a motion then decked
Cage

Front Elevation of Head Frame.
On this station are placed the principal pumps of the mine.

1 single pump cap. 4500 gallons per min.

The water is forced from the rengpit the bottom of the mine at this level by means of hydraulic elevators. Continuous stuff built by Besen Iron Works.

Throat pieces cost $150 each.

Water forced down the pipe F and up thru the nozzle C in going up it creates a current thru the nozzle and a partial vacuum at the point I. This causes the water to rush in and is forced up thru the outlet pipe E.

The efficiency of this pump is about 25%.

The hydraulic water is supplied from Wm. Davidson.

The principal water supply on the part H. Halls made of Bronze.
This water is discharged into a cistern at the 2150, from which it is pumped by Balwin Double Acting pumps.

Balwin Pumps.

Air chamber

Air chamber

Check valve

Suction valve

Capacity of each pump 2500 gals, three sets. Total Cap. 7500 gals.

1 Motor drives each set of 4 pumps.

Rating: 150 H.P. DC Motor Type C Induct Motor.

Constant Speed.

200 H.P.

E.M.F. 2200

Amp. 360 Terminal 195

3 Phase

7200 Vols.
2000 Drift N.

24 ft. piano frame.

2000 lbs. cars.

In the drift was stored engineer's material.

For stages in 2000 steel a small

Dove air hoist was used.

This hoist was run by means of air

valves and checked by threads.
On a level of the Ophir we form a Venturi Tank - cap 4000 cfs or 7 per sec.

2300 Ophir

Motor Grundy & Nolthoff

Double Drum

Double Indicator

Note


gal. Min.

Ophir 2400 Oil average 10c

Taken from Crosscut.

Method of cutting:

8 holes

7 x 6

Barley Drill used used.

3 men to a face.

All the taking from the Ophir is handled thru the Mexican shaft

Man Ari Pipe 20" = Junk line

Lat 11° 15'
Power Sub Station
at C&C

Current 2300 volts
Transformed by water transformers
to 2000 volts

Rope Plant
At this place the ropes for the
plant are woven and repaired.
Rope replaced by the following
dimensions:
21 strands 3/8" each
Twist to each strand 1/32" each
3 small strands to large strand.
Rope replaced at intervals of 1 year.
And repaired.

4 years continuous life of rope.
Old man can weave 10-15 per
day of rope.
The hoist rope cables are examined
thoroughly once a week.

At the warehouse all these
timbers for C & C there can be framed
Blacksmith & Machine Shop used for C & C
& Others as is the Store Yard.

Some supplies in yard,
Worthington Double Action Pumps.
Multi-stage Centrifugal Pump
Efficiency 68%

Worthington Pumps

C&G Shaft

One of connected steam driven credit
Band Inducer

Port across on wheels. Picked up
and out by jaw clutch.

The ore is discharged at 1st sta
below the surface and run to bins

Trackage arrangement to Ore Bin

A large change room at the station
for men from 0 to 520 lbs.

Arrangement for hanging working apparel convenient and
not sanitary.

In Power Plant.

Signsall - Signpost Frontage

comparison
Driven by Westinghouse Motor

200 W.P.
2000 C.F.M.
3 Phase
Low Full Load horse 570
7200 volts

23” Stroke
24” width of drum wheel.

OPHUR Shaft.

The Ophur shaft is used as a down cast shaft. While the Ophir is used as an up cast shaft.

The Ophur shaft is used for ventilation only.

At this shaft is installed a large exhaust fan.

Cap. 175,000 cu ft per min.
Kinkhead Mill

Gyratory Crushers

Mill Ore Bin

Automated Feed

6 Kinkhead Mills

Overflow

Clean-up Pan

Concentrates

Matz Oil from C, E, & O bin dump

1 ton concentrates to 6 ton oil

1.5 t/h

24 hr two-shift handball whole mill

88% dried by concentration

Concentrate varies with oil average 1.2000-

Pulp to tailbox to -4

60 mesh screen needed for mill - 1" ripple punch

2.5 R.P.M. mill

Processed 49,000 tons - 25 Amps

2000 volts 60 cycles
Weighted masses used 1300 lbs. 2.5% of total goes back to foundry

Salt cleanup netted 3400 from amalgamation
$16,000 in concentrates

Belt speed of Free Canvas Mill
195 R.P.M.

All driven by 10 cycle
Motor 50 HP
2680 Volts
14 Amp.

Canvas Mill
Fine silver sulphides caught
Hope of Mill - 3/1 to 1

Cost every hour - Washed from canvas to settle
to Anode

Automatic Dispenser

One arm longer that the rest which fills the sample jar
Kinloch heads classifier

Sand

Water

Paddle

Inflow

Slime overflow

Sediment pond contains 13,000 tons
Average $3.10 per ton
20-25 mesh tail to ton.

A cyanide plant will be erected to handle tail.
Mexican Shaft

We entered the Mexican from the other. Entering the 2000 Mexican at this point was stationed. A compact hoist driven by Westinghouse motor.

Strict car controller.

2500' Mexican

#5 Cameron Drilling Pump

H = suction pipe
G = delivery pipe
F = air chamber

Two of these pumps are stationed at this level to maintain water from the swamp in shaft nearby.

A - B - C - D,Mine Office was stationed at this point. The mine is connected with this system.
This is to show the position of the G-1500 column.

Clear off the wood

1/8" H x 3/4" L

Attach a 1 1/2" screw

0-1500 to the 2" x 4" framework.

0-1500 at the maximum height of 21.5" and

below will show which is ground ring needed.
Modern Steel Head Frame
Union Shaft.
Union Shaft

This shaft handles all ore from the Mexican Mine.

Union Iron Works built the shaft and used an electric street car controller.

May 1900, 01-01-21

Denver, Colo.

D.C. Electric Motor
100 H.P. - 440 Volts - 60 Cycles - 175 Amps.

One wheel had incline and one wheel flat.

The wheel was inclined so that the rope would lead down onto the sheave wheel.

A steel head frame was installed at this shaft.

At this shaft was installed a large all-steel electric compressor.

Driven by Westinghouse Motor
10 H.P.

Reynolds Silent Chain Drive used.

Ore from mine is taken direct from 1000 ft. in the car and dumped into a gyratory crusher.

Product from crusher delivered to a conveyor system which carries it to stock piles and ore bin of Mexican Mill.
Mexican Mill

Gates Breaker
14" belt conveyor

Mill Ore Bin

5 Stamps
5 Stamps

Trenzation

Thick. Slimes
Thick. Slimes

Agitating Tanks

Thickener

Clear Water

Zn. dust & solution

Aug Ag Solution

Zn. dust & solution

Ore Filter

slime cake discharge

Merrell
Filter Press
precipitate

Bullion Furnace

Steel Harry
Support for cylinder
12" X 15" 6:2" C to C
2" planting
Dimension of Unit 22' X 14'8"
Stamp No. 12 - 1250 lbs.
4' X 14' Stamp drum.

First Chilian - 2" thick from stamp discharge to chute
feed 6'
54" dia. inch malleable
8" track

Alkali Chafing 8" X 12" feed
14 1/2" X 41" wide sat top 36" deep
Spiral flows 24" dia.

First Tube 5' X 18'
16 Pumice Pebbles used.
Line 71" dia. - 16' depth
Dore thickness 26"-
Mud Press

Supports for tanks.

[Diagram with measurements]
Yellow Jacket Mine

At this shaft is installed a
Hydric Iron Works 2 drum hoist
Electric Power - Fleet Car controller
400 Volt - 250 Volt - 75 HP
60 Cycles
440 Volts - 125 Amp
Duplicate Dial Indicators
on each drum
Speed 550 - per min.

This mine is working old stop stope
Oil averages 45 - 8%

Ore from this mine is hauled to dump,
forming large stock piles

From stock piles run to chute at base of
over pole. The man picking & loosening
material 20 yds. to form a cone or funnel
like opening through which the ore veins to
bins.

Two men break face for chute at one
but while one the chute is being worked.
Wages per man $3.00
For long car over 196 feet. Each man
receives $4.00 per car.
Yellow Jacket Mill

 Ore from stock pile is transported to breaker
 Gates Gyraotry

<table>
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<tr>
<th>Mill ore</th>
<th>Bin</th>
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| 10 Utahs gone Vanners | 10 Johnston Vanners |

From breaker bin ore is transported to Mill ore bin. It is fed from mill bin to the Knickhead Mills by means of automated ore feeders

200 tons of ore per day

Automatic ore feed

Crushed product from mill goes to Johnston Vanners

Tons of concentrates from the 20 Vanners per day

The concentrates are dried, sacked and shipped. 95% Extraction obtained

A small amount of free gold is caught in the traps of the mills and amalgamated.
Johnston Varner

Water

Concentrates

Belt

Sands

125 R.P.M.
Belt Speed 5 mm
1/2" thick

Bin for mill
10 x 10 meters
36" x 16" meters
10' width option at 12'
10'

Mill water storage tank
4 x 16'
Mill Driver by 25 H.P. Induct Motor
85 C.O.P.
60 cycles
28 amps
208 Volts
Head 72.0

The tail from Mill run three to a team by handling hand and are hankerled in tunnel to a sampler which takes a portion of the whole stream away 20 mins. note

The water flowing into the pan of sampler gradually fills it to gradual height that it overflowed over the edge and a portion...
Of the whole stream for an instant
this is done every minute.

Shops & Materials Yard
Ward Shaft.

H. J. Booth Gear Driven Hoist
Ward Shaft.
Ward Shaft.

This shaft is used for pumping and draining purposes exclusively. No tie-up is used for this shaft.

It is cast iron with 12 threads. On the surface there are two holding plants, one near shaft, and not under cover. The main shaft is not used at present.

Inside is 6-1/2 Ton Drive. Could add 250 H.P. required to move the main shaft by 1000 ft. per minute. These pumps are connected for each rope.

This shaft is used at present for the handling of bags and racking products from pumps to the Winpisinger plant shown.

2100 ft. deep.

On this level are installed three sets of pumps of Motor type.

Capacity of each pump 1000 gals per min.

65 ft. lift.

Two 650 R.P.M.

And 400 H.P. Motors.

Direct connected gear drive.

Three pumps lift the water to the

Intrados and up.

Motor valves

5 values

to each shaft
Ingersoll-Sargent Compressor installed at surface shaft 14"-stage x 2000 HP
Driven by 1000 HP Motor
2 Phase 2000 V.M.F.
Compressor Belt driven

Among supplies in yard were stored the 15" column pipes, these are lined with wood to resist corrosion action of water.

Risdon Iron Works Hoist Ward Shaft
From the P.V. T.V. of the Ward that 14" x 14" connection made with the RW Tunnel

Dimensions of tunnel at this point

Dimensions of tunnel at this point

14 x 14 of 10 x 12 timbers used

Discharge pipe in tunnel varies from 24" - 38"

Risdon Iron Works Hast
showing dial indicator
Ward Shaft
A 1,400 BHW 2,000 HP pump, installed at this date.

The installation used only when the power on 2,000 ft. not running and left the water to the Antioch Tunnel (Elevation 1,300).

Driven by 700 H.P. Motor
at 770 R.P.M.

Hub of Motor 140 to 160

Life 8 months.

In this Moe Drift one being driven out into the country rock, the object being to drain same Harvey & Walsh. And thru drift act as channels for the water to flow top pumps.

After Moe Drift the country is first pretressed with the Diamond drill for water. The idea being to prevent an slurry in the well of water on going a shot of 5-1/2 in. The drift and finished deep hole are flown with steel and then stone holes will act as water channels.

There is a small Diamond Drill at work on the 24 B.H.W. The head at present drillon 1" hole 12' to 18' the shaft air driven to hollow steel and fed water feed, steel directions for 6' each. Cutting point of bits has set with 6 bolts.

2 men required to windmill.
Combination Shaft

This shaft was sunk 3000' to a level to open up new and heretofore unprospected country. No ore was ever found.

An elaborate equipment was installed on surface and underground.

A large expensive Cornish pump was installed. Cap 3000 gal. per min.
20 inch pumpage
9 Stroke of beam
Pumpage installed every 30°
Pump rod 12' x 14' Hammers applied with plates of iron

Shaft has 4 compartments.

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Shaft No. 4 used for mucking
Shaft No. 1 used for hoisting

Oreips much larger than steep used in other mines in this vicinity.

Cap stones

Mine & plant represents an investment of approx. $300,000 which is being held and deprecating rapidly in value.
Conveyor System from Chollar Mine to Buttes Plant.

Machinery for System
Loading Station
Incoming Stationary Rope 1 1/4"
Stationary Rope 1 1/2"

Gear box including traction rope

Friction clutch

Gear box - driven by 15 HP Motor

Bucket Elevator

Elevation

Ore Bin

Ore Loader

Incline slight L for return

Open door

Stopped on return by air compression
Butter's Plant
showing rope tramway & receiving station.

Conveyor System crossing canyon.
One treated in this mill comes from Chollar Min.

One transported on Wire rope railroad (lining described) to the bin.

From 1250 tons to challenger 750 tons to Stock

Stampers 1 - 5 in a set. (150 tons)

Order of 1907 - 3 - 5 - 24

102 horses per 24

From stampers to Hob Chambers

Overflow from one to one tube, overflow to the other tube (13 x 12) for fine grinding

Product to gravities comes

Overflow to Vannet. Underflow to tubes for fine grinding.

(Note) Vannet were not working properly not

Vannet adjusted just right.

The vannets were practically clean.

While the ore treated was an 0.25% grade ore

I think they should get some concentrate

or cut the vannets out entirely.
The vannus was however in a very poor condition, numerous parts being practically worn out.

Overflow from vannus to settling tanks 12" in diameter. One tank settling while other is filling.

Sand removed by circular plows which pull material to a conveyor and part of tank to another conveyor which removes them to another tank. They are distributed by a circular recirculating wheel which distributes them in the tank uniformly.

Hydriide not added and sand allowed to settle. Lines from settlers go to a settling cone to remove solids and sand in front to and tanks.

Lines then go to intermediate tanks from here to thickening tanks.

Front thickens to butter filter. Solution from filter to storage tanks.

Addition of solutions from storage tanks to line loss. Overflow goes to waste.

Precipitate to collecting tank from tank to filter press.

From press to oven and roasted. Roasted precipitate placed in a graphite crucible and treated in a muffle furnace. Precipitate averages 74% before firing as candied
For 1 it a 6" Bdt & 2" shaft to a 1/4" belt
Then a 3" shaft to pulleys which run
three pulleys and don Blackizer 1" belt to
Don Blackizer

Size of belting from Motor to Tube Mill
1 1/4 x 10' dia
5" shafting

Motors:
65 HP motors for Baling
2 - 85 HP 220v 60 cycle 720 R.P.M.
2200 Volt 60 cycle 720 R.P.M.

1 - 75 HP 19.5 A 60 cycle 2200 Volt 600 R.P.M. no load
16" pully 14" belt

Drive 3rd Tube

Instruct to 2000 Volt 3 Phase 1200 Amp. Transformer
supply 2 HP Motor drives 6 Tonnes & 1 Frame Pump
which pumps oreage from Tube Mills back to
the Mill

Sand Excavat 10 HP Motor

Motor 5 HP elevator sand
20 HP Motor driving centrifugal pump which
is used as an agitating pump.

50 HP Motor for large compressor
50 HP Motor for generators

75 HP, 75 HP, & 1 PH.

20 HP used to pump water
10 HP used in Machin shop
Some dimensions

Measurements of dumping station
Plate only 13' x 8' x 8"
Capes 6' - 3" c to center
10 x 12"

All supporting timbers = 8' x 8"

12' - 10" outside dia of shell 7'
1' 6" gauge track
10' x 12' sill = 7' 2" x 7 1/2"
6' x 8" + 4' x 6" = size of valves at
end of building
1 x 4" planking

All pipes 6 1/2" cast iron vertical
10" x 1/2" + 12" pieces nailed on

Induction motor for running stamps
60 HP 120 RPM
Belt 2"
Bally 15" dia
Belt 15' long
Belt 26" pull
Bally 4"

Stamp Belt 2"
Dia pull = 6' 8"
Power transmitted three 4 bell
Bally Post and ties

Width of stamp box 5' 10"
18" need
Not all power is used in running stamps
Part is transferred by setting the
Wilkly Table 5'8" x 17'2"
1/2" rated backflow
slope of table 1/4" - 1'

Don Classifier 17'9" x 5'6"
Depth 25" fall from top to bottom
28" high at top bottom
17" high at top

Free Trough 137" P.M. 1/2" peg

Tanks 5' x 15'

Agitation Tanks 16' x 10'
Air-Ag Tanks 20' x 15'

Filter 9'8" x 4'8"

Fine Boxer 1 compact
each compact 8'2" x 30"
1/2" shell walls 45" deep

Lamella for Don Classifiers
6' x 6'

Winter Pump 3" discharge

Filling Wheel 35" dia. out 25" inner
7" drive wheel
4 1/2" inside
Drive for Agitators shaft 2" hex 6A
Geology in Vicinity of Hay ward Mine

Drift

Augite Andesite
Quartz porphyry no value
Di rite diabase

Soft indurated
Horn Andesite
Epidote very characteristic

Mineral E N
Ails NE
Raymond Mine

At surface is installed one Annin Hoist, Model 375, per min.
Driven by 5 HP. Ratchet Motor
5 1/2 HP - 6 Amp. 440 volts, 4160 RPM
Screw for controller

Base for indicator

"X4" Cable used
To the lead connected to a grounded resistor.

Sorebrook Road Compressor
2 stage
Right hand side 15100 HP.
Left " 15100 HP.
Air cylinders
Left " 12 x 14
Right " 10 x 4

All driven by 5 HP. Electric Motor
60 HP.
Continuous HP. 100
131 Amps
440 Volts
Controlled by street car control.

Air Tank 41 "8' 8"
Air pressure in tank 80 lbs.
Head Frame Incline Hayward Mine.
A frame of incline a Combine Heilbronn is installed on cap tower for main. Driven by gear motor 1.5 HP.

440 volts
19.8 Amps
60 cycles
Speed load 1200

Ordinary windmill pumps used to pump out.

Pump, pulley, belt, flywheel.
There has been much movement along the vein. Consequently, the quantity of material in each stope is much reduced. For mining, the vein is split into three sets: each split placed in the vein and the ore allowed to flow into the cars.

Some ore sluices used

Finger gate

One chart from stope

In other places, the ore is hauled out of stope to lend alone.

They are backfilling in these stops with waste.
Loading Station Bleichert System

Towers

Tower Support
Gypsum Quarry
Nevada GY Co
Mound House.

This deposit is of very great extent and is practically pure gypsum.

The gypsum is covered with about 2 of silt and sand.

The silt and sand is first broken. The ground material is then removed by means of

Scrapers
3/4 " scoop
1/2 " pick & shovel.

Holes are drilled around the top edge of pit and about 1/4 back of edge and

Pit. These holes are used to spring ground. The ground is rung open about

and a month.

The ordinary shooting or shooting which is done every day to break the gypsum and
cause it to fall into the pit is done in the following manner:

Holes are bored at the base of the wall to a depth of about 15-

One man can drill about 6 or 7 holes.

Bulls "Mark III" drill used.

The holes drilled are sprung or shot with 50 sticks,

Second spraying 10 sticks

Third spraying or final blast 130 sticks

Hogger 1 1/4"
The men first shoot at base of small then climb on scattar much pile and drill is shot about half way depthing a c. For men at all the drilling loading & shootin.

The gypsum which is shot down is placed in cars by hand on both the aid of a sideling fork.

Two men work together and run cars to the breaker.

The two men average 16 cars to an hour. Ave. 2 tons to car.

There are 6 gangs of 2 men each loading and hammering.

At output 200 tons per day.

Wages $3.25 per day.

6.00 " " " Normal

In the summer the work of loading & hammering is done at night on account of the intense heat.

The reflection of the light from the gypsum very injurious to eyes.

Plan of Quarry
Max width of quarry 201'
Average heap to pusher 575'

Blake crusher used cap 30 ton pusher driven by West Carbon Motor
10 HP
7200 Volts
10.5 Amps per ton
3 Phase
60 cycles
850 R.P.M. at full load.

Product from crushe carried on a 17" conveyor
belt to bin

Conveyor driven by 7.5 HP Induction Motor
from Bin to Blasted conveyor

No of cars loaded at conveyor hour
varies from 250 - 365 per shift
Average 400 or 50 Batches per hr.
Buckets average 1700 lbs.
Dist from loading station to receiving
bin 173 miles.