

NEW YORK
35 Nassau Street
Phone Cortland 7331

MINING AND ENGINEERING WORLD

DENVER
307 First National
Bank Building

No. 10, Vol. 45:

CHICAGO

September 2, 1916.

Mines and Mining Operations at Ely, Nevada

A. G. HILLEN.

An inspection of the mines and mining operations, the mills and smelters of the Robinson mining district, of which Ely is the center, presents a most interesting and inspiring view. Whether considered at the mines, in the mills, or at the smelters at McGill, the effect produced is that efficiency, smooth running and good management prevail.

The Nevada Con. Copper Co. is moving and reducing better than 10,000 tons per day. This volume or tonnage of ore is transported from the mines at Ruth each 24 hours a distance of 25 miles to the mills at McGill in trains of 20 to 24 cars each, and the average is a train of 50-ton cars every two hours.

A daily production of 2000 tons of this ore comes from the Ruth mine shaft daily, the balance is mined by steam shovel from the great open-cuts or pits. To accomplish this great task, an immense plant, an army of operatives and tremendous mechanical forces are employed. The result is approximately 250 tons of copper matte, running well in silver and gold, as the daily production of the Nevada Con. Co.

Following the ore as it is mined and loaded in the 50-ton cars, across the 25 miles of hill and valley to the crushers, where it is automatically and mechanically unloaded, mechanically fed from the ore bins to the hoppers, from hoppers to crushers, from crushers to Huntington mills, and after grinding, to the immense batteries of concentrator tables, which number over 1100, where coarse concentration is effected, the pulp is conveyed by mechanically-driven conveyors to rolls and re-ground for further reduction in 12 batteries comprising 470 Frue vanner tables. By gravity launders and pumping, the solution is conveyed to the settling tanks, the pulp material segregated by draining off the solutions, dried and loaded into cars by other mechanical devices and transferred to the huge McDougall reverberatory roasters, a quarter mile from the mill. After preliminary roasting, it is conveyed by car and tram to the converters, which produce the red metal in matte form, weighing about 400 lbs. each.

This briefly, is an account of the transformation or transmutation of the ore and its copper, gold and silver content from the immense mountain area of

porphyry, containing 1½, 2 or 3% copper in the porphyry mass. To all intents the operation would appear continuous and complete, though the processes are perhaps technically complex and require deep scientific demonstration. For instance, the addition of a little oil sprayed in the roasters at just the right time, where the sulphur content of the ore does not complete the roasting, the dumping of quantities of lime in the converters, appears simple enough, but produces a condition that permits pouring the copper at just the right heat, at the right moment, and secures first, the oxidation of the ore completely, and later by the addition of the lime, produces complete combustion of the iron content of the roasted ore and evolves the complete processes of smelting and reduction essential to a high saving of the copper.

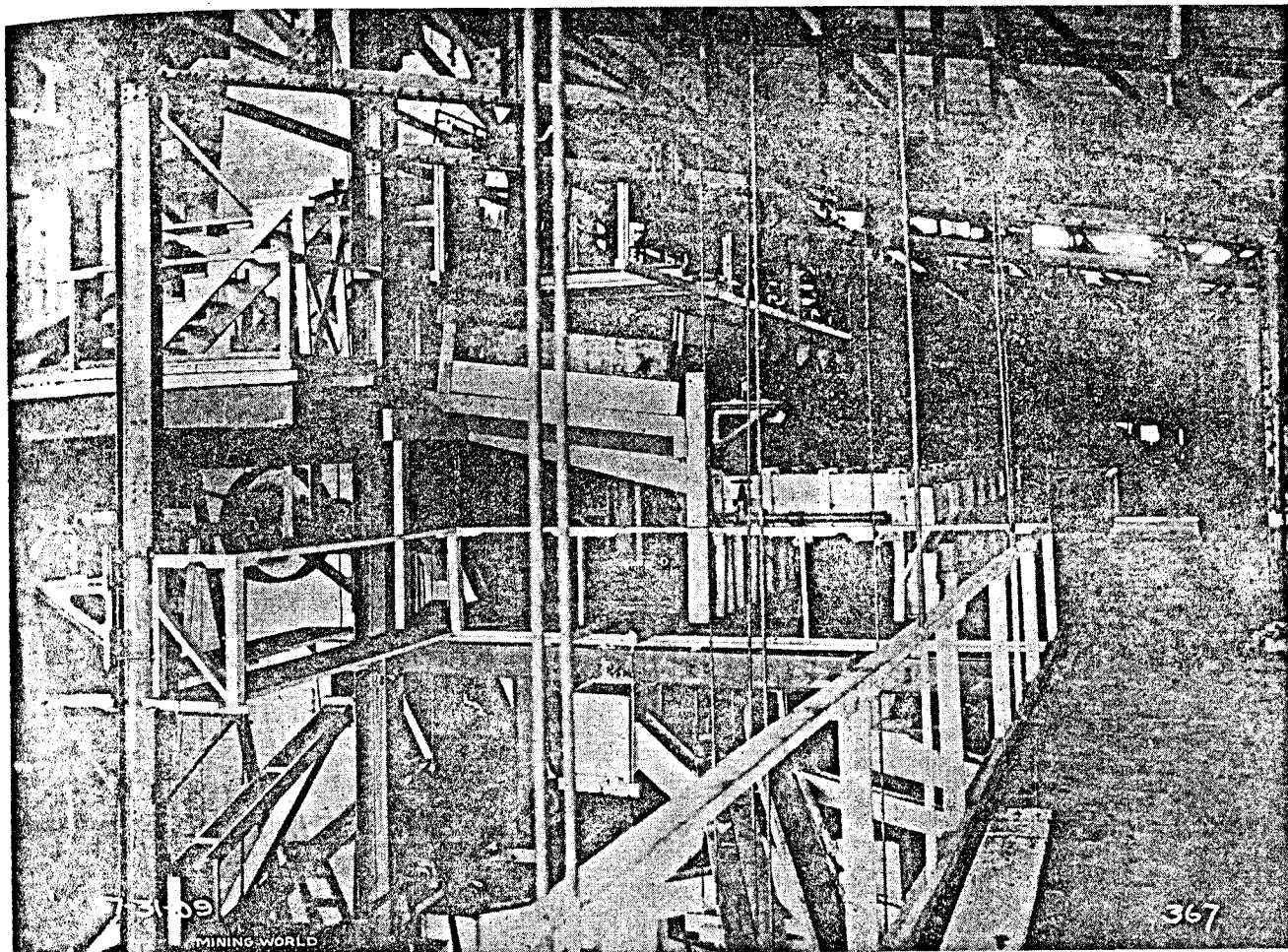
Necessary to the operation of the mines and mills of the Nevada Con. Copper Co. and its immense reduction plant, reducing upwards of 3,000,000 tons of ore per annum, are first the immense power plant consisting of one 2500 k.w. Westinghouse turbo-generator, two 15-kw. engine-driven generators, Nordberg engines and Allis-Chalmers generator, two 800 kw. Allis-Chalmers generators driven by Allis-Chalmers engines, one 1500 cu. ft. and one 18,000 cu. ft. Nordberg blowing engines for the copper converters, one 8000 cu. ft. Allis-Chalmers engine, one 20,000 cu. ft. General Electric turbo blower. In addition, a 300 cu. ft. Connorsville blower connected to tandem compound engine, a 1000 cu. ft. Laidlaw-Dunn-Gordon steam-driven air compressor, all these units being supplied with steam at 160 lbs. gauge pressure 100° super-heat, and are uncondensing and connected with surface condenser. Approximately 40% of steam is derived from waste heat boilers and reverberating furnaces; the balance of the steam is derived from coal-fire boilers in power house, a building about 400 by 180 ft., with concrete base.

There is a steam-driven Nordberg pumping engine at the concentrator plant with capacity of 12 second-feet, supplied with steam from power house. This engine is for handling return water from the mill. Approximately 15,000 hp. is used.

Utilizing waste heat of the reverberatory

eight 400-hp. Sterling boilers, and two 400-hp. B. & W. boilers. This steam is super-heated in separately fired Foster super-heater, located in the power house boiler room. In this room are eight 400-hp. Babcock & Wilcox boilers and two 600-hp. Sterling boilers. These are fired and equipped with Green and Sturtevant economizers. There are four Goubert feed-water heaters. The boiler-feed pumps are of the steam turbine-driven type, and 3-stage centrifugal, with Terry turbines and Jeanesville pumps. The draft is furnished by five Sturtevant induced draft fans direct-connected to Sturtevant engines. The circulat-

from Duck creek, in a valley comprising about 100 sq. miles of arable valley land, 12 miles east of the range of mountains close to the plant, and is brought in by a 32-in., wood-stave pipe line 10 miles in length, with gravity flow. This is supplemented by two 5 second-foot De Laval centrifugal pumps, motor driven, which pump water from a large spring below the smelter. These pumps work against a head of 460 ft. Due to the isolated location of the plant, extensive machine shops are maintained with modern foundry. The average output of the foundry is about 130 tons per month. All structural steel work required for the



CLASSIFIERS IN STEPTOE MILL, MCGILL, NEVADA.

ing water for the condensers is furnished from Duck creek, and after passing through power house condensers flows by gravity to the mill, thus eliminating circulating pumps or cooling towers. The make-up water for the boilers is taken from outside the circulating line and passes through a mechanical filter and a water softener, both built by the Kennecott Co. The electric current is generated to 600 voltage, and is used at this voltage in shops and smelters. The electric current going to the mill is stepped-up to 14,000 volts and the current going to the mines is stepped-up to 40,000 volts. The mill transmission line is 3000 ft. long and the transmission to the mine is 25 miles long, at both places the current is stepped down to 600 volts before being used. The water supply is furnished

plant is fabricated at McGill. The estimated cost of the entire plant is \$4,000,000.

In charge of this immense plant of power and mechanical machinery is Lindsay Duncan, mechanical engineer and former professor at Cornell University.

A new crusher plant is being added to the big mill of the Nevada Con. Co., and new furnaces installed. It is expected that by January 1 these new additions will be complete and in operation, when the daily tonnage of ore will be increased to about 15,000 tons.

The Hidden Treasure Co.

Owens four claims, 63 acres, northeast of Ely, near the Ruth mine, and covers about 3500 ft. of the porphyry and porphyry-lime area. The property has pro-

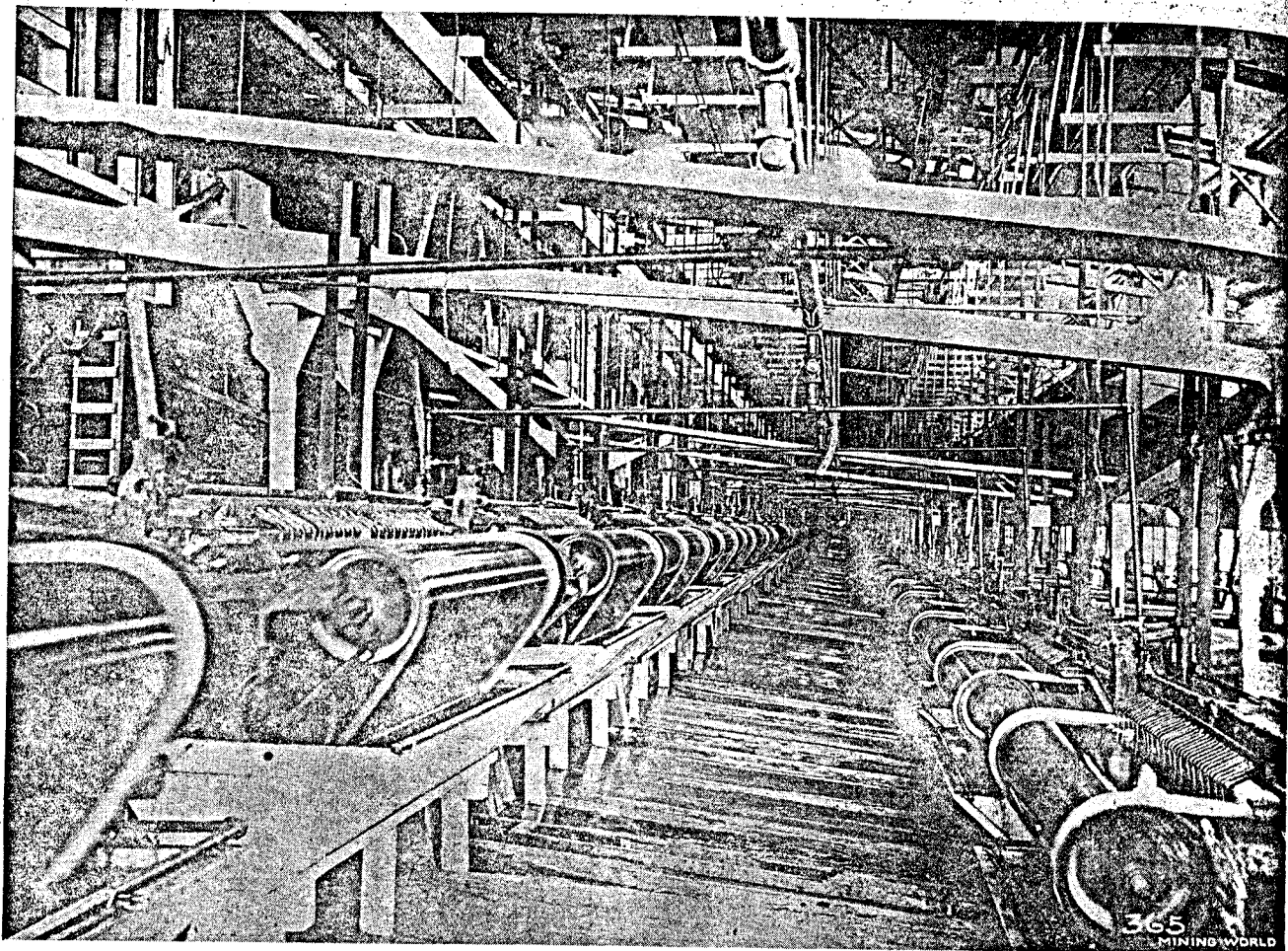
duced a rich copper and silver-lead ore of shipping grade. A shaft in the porphyry shows copper ore at 50 ft. At 100 ft. appreciable enrichment appears and assays running as high as \$14 gold, 47 oz. silver, and 42% lead were obtained. A tunnel driven 400 ft. to tap a silver-lead vein is still 200 ft. from the lime contact. There are quartz croppings on this claim showing stringers and bunches of high-grade copper ore, with gold and silver values, and much iron capping, the usual indication in the district of copper ore bodies. On the north end of the Ontario claim, owned by this company, are rich bodies of silver-lead ore, consider-

erly and with a strip about north 30°. The property lays 2 miles east of Ruth and about the same distance from the Nevada Northern railroad.

Mr. Paine also owns three claims near Lane city, 2 miles west from Ely, which show valuable deposits of silver-lead ore partially developed.

The Argus Mines.

At the old camp of Taylor, White Pine county, situated 18 miles southeast of Ely, is located the property of the Argus Mines Co., of which H. G. McCulloch of Ely is manager. This camp was a producer



LOWER CONCENTRATING FLOOR, STEPTOE MILL, MCGILL, NEVADA.

able of which has been extracted from surface workings in past years, but which now require further development. The Hidden Treasure Co. is controlled by D. C. McDonald and associates of Ely.

The Hayes Mine.

Consisting of a patented claim, 200 by 1000 ft., adjoining the Ruth of the Consolidated, and owned by D. F. Paine of East Ely, and is preparing to ship. The Hayes is working in a body of copper-lead-silver ore in a tunnel being run to tap workings above, which show bodies of silver-lead and gold and silver ore and from 4 to 5 ft. of zinc carbonate ore that will run 30% or better. The ore lays in pipes and shoots between strata of lime about 20 ft. in thickness, pitching east-

of silver-gold ore in the 80s, most of which was taken from a bedded deposit and milled at Argus Lake on Steptoe creek, 8 and 12 miles distant respectively, the old pan amalgamation process being used with an extraction of 75% to 85%, the ores being free from base metals. The total production from the Argus and Monitor mines is reported to have aggregated close to \$2,000,000.

The ores from the Argus mine as milled averaged between 45 and 50 ozs. silver and 80 cts. gold per ton. In the 90s these properties closed down, with the decrease in price of silver. The material of the principal lode is quartz and feldspar, containing pyrite and manganese, much oxidized at the surface and assaying \$1 gold, 1 oz. silver, with traces of copper and

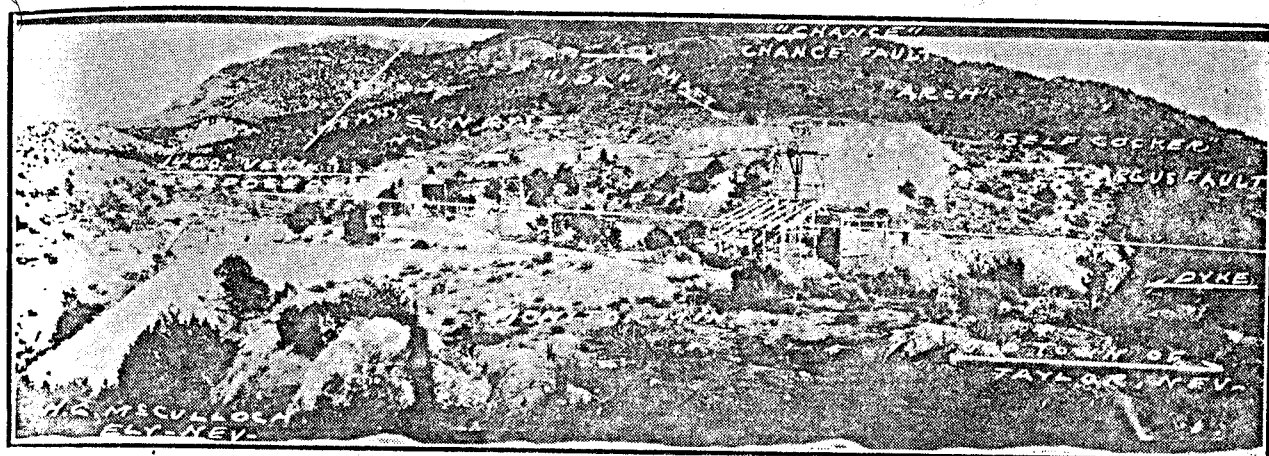
Septem
lead.
ore of
ft. ju
two pl
black
cite, st
gray co
of \$27
forming
fact fo
to a je
galena.
ondary
fault p
This c
posit.
The
fissure

ton in
shipmen
The
with L
trolled
G. McC
corpora

Ow
15 mile
formati
ore, can
a bedd
come 12
ing \$3.
shipped
ress cla
to the
cipally
show 1
ture of
runs as
ore. D

tunnels, drifts, raises, etc., the deepest being on the Success, which is 300 ft. The property of the Success Co. constitutes an immense mineral domain and with proper development should become one of the big silver-lead mines of the west. Equipment consists of 50-hp. hoist, two 60-hp. boilers, a 4-drill compressor, drills, pumps, blacksmith shop, saw mill, pipe line 3700 ft. long, giving ample water supply, carpenter shop, store house, powder magazine, etc., office buildings, assay office, stables; \$110,000 has been expended in development. D. C. McDonald, one of the pioneer mining men of White Pine county, is manager and general director of the Success, with offices at Ely, Nev.

Owned by M. B. Garrighan and associates of Ely, adjoins the Hidden Treasure, 3 miles west of Ely, and has made shipments of lead-silver and gold ore.



ton in copper, lead and silver, which is extracted for shipment.

The Argus Mines Co. is capitalized for \$250,000, with 1,000,000 shares, par value 25 cts. and is controlled by the Harker estate of Canton, Ohio, and H. G. McCulloch of Ely, Nev. The company is a close corporation and has no stock for sale.

Owens valuable property in the Schell Creek range, 15 miles east of Ely, consisting of 28 claims. The formation is dolomite lime, shale and quartzite. The ore, carrying gold, silver and lead, makes in the lime, a bedded deposit between the shale and quartzite, some 1200 ft. in width. Lead ores, up to 66% carrying \$3.50 gold and 30 to 40 ozs. silver have been shipped from the Fairplay claim. A vein on the Success claim has been opened 180 ft. in length and down to the 200 level, which is better than 3 ft. wide, principally a brown and yellow carbonate. Shipments show 123 ozs. silver, \$12.80 gold, 65% lead. A feature of this ore is the gold content, which frequently runs as high as \$60 to \$80 per ton in the carbonate ore. Development consists of over 3000 ft. of shafts,

The Hoan is developed by shaft and tunnel. Shipments run 4 oz. silver, 35% lead and carry some gold.

Fourteen claims, located at the head of Grass Valley, White Pine county, 85 miles east of Ely, and owned by W. B. Bergman and associates of Ruth, is being developed, and shows from 1% to 8% tungsten ore, carrying high-grade silver values up to 200 oz. Samples of tungsten up to 12% in a 14-in. vein in granite is being run on by tunnel and drift and some good ore put on the dump.

The Butte & Superior preliminary report for July on its oil flotation plant compares as follows:

	Tons ore.	Costs per ton.	Zinc con- cen., tons.	Value per ton.
July	45,875	\$3.64	8,686	\$48.83
June	48,475	10,830
May	50,688	3.22	11,658	65.25
April	50,112	2.84	12,080	83.79
March	52,089	2.69	12,190	83.62
February	49,800	2.52	10,775	93.56
January	49,428	3.05	10,535	101.60
December, 1915	45,277	2.93	10,409	86.00
November	47,872	2.91	10,386	90.58
October	43,092	2.75	10,473	79.59
September	37,278	3.19	8,968	81.27
August	40,809	3.28	9,561	80.73
July	41,547	2.95	9,482	75.76