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HARLEY A. SILL
CONSULTING ENGINEER
1011 SOUTH FIGUEROA STREET
LOS ANGELES

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HISTORICAL RESUME OF THE MINES ON THE COMSTOCK LODE -

VIRGINIA CITY, NEVADA.

FOREWORD:

Few mines are better known than the Consolidated Virginia and California. Originally they were separate organizations, but of later years were worked together as a single unit and they are, therefore, so considered in this historical report. The value of their production during a four year period in the latter 70's, exceeded anything before or since known in gold or silver mining history. Briefly, these two adjoining properties, having a combined length of but 1310 feet, produced ore of a value of almost four millions of dollars per month and paid nearly half that amount out in dividends for many consecutive months. A sum amounting to $77,932,800.00 was finally disbursed to stockholders.

In view of the above statements, one would naturally assume that no great area of vein could have been left unmined. Yet, such is not the case and can be explained briefly by the fact that the ore body from which such splendid profit was derived, was discovered at great depth through the medium of a penetrating drift from an adjoining property (the Best and Belcher) and formed an independent ore body beyond the hanging wall, leaving the main Comstock lode 600 feet to the west. From this time on, mining continued downward until the great depth of 3000 vertical feet was reached - about 4500 feet on the dip of the lode. These mines continued work in profitable ore until the intense heat of depth and excess of water compelled the cessation of operations.

The Comstock lode proper, from the point of penetration of the lode and the "rift" upward - a distance of 2800 feet - remained unexplored except for some limited exploration drifts and some superficial surface workings which will later be explained in detail.

If one is to assume the average width of gold bearing quartz at 65 feet, the width shown on the maps of the U. S. Geological Survey of the lode about midway between the surface and the point of penetration of the "rift", it is quite obvious that a vast tonnage of ore would exist in an area 1310 feet in length and 2800 feet in depth. Roughly this would mean about 15,000,000 tons of which somewhat more than half should belong to Consolidated Virginia, it having an ownership of 110 feet more on the lode than California.

Such an estimate of tonnage is manifestly absurd in view of the fact that its assay value is unknown as are likewise its widths, except at the point mentioned. It is merely given to indicate the possible contents of such an area. On the other hand, it is not an improbable tonnage of gold bearing quartz, even though much of it may not attain standard commercial values, because it must be remembered that at greater depth in these same two mines, a single segregated ore body with a length of 500 feet, a width of 92 feet and a depth of about 400, produced in excess of $100,000,000 worth of gold and silver bullion carrying throughout an average assay value of more than $100.00 a ton.

Before describing the Consolidated Virginia and California in detail, the following general outline of the Comstock lode should help in presenting the great ore body more clearly.

THE COMSTOCK LODE:

This great gold and silver vein called a "lode", a term used in mining where veins assume great dimensions, is located on the eastern slope of the Sierra Nevada mountains, in the State of Nevada, just over the California line. It is only 21 miles from Reno on the Southern Pacific, with which it is connected by both rail and automobile roads.

Much has been written on the history of Comstock mines and many books on the subject can be found in all large Public Libraries. As space is limited here and but a few words can be said on the subject, some of these volumes may be mentioned for any further study that may be desired. Among others can be recommended:- "The Comstock Lode" by Ferdinand Baron Richthofen. "The Comstock Lode, Its Formation and History", by J. A. Church. "The Big Bonanza" by Dan DeQuille. "The Story of the Mine" by C. H. Shinn. "The Sutro Tunnel" by Adolf Sutro.

In addition to the above are the United States Government reports by Clarence King, J. Ross Browne, R. W. Raymond, G. F. Becker, James D. Hague, and many others.

It may be mentioned here that from 1862 until 1886, the United States Government, through both the Departments of War and the Interior, took an active hand in the guidance of all underground work. Through the work of Government engineers, ventilation systems were established, accurate surveys made at frequent intervals of all underground work, and statistics of production costs and bullion yield were printed and distributed to the various mine managers. The Government Atlas, showing underground surveys are records of care and accuracy and have always been used by the various mines in operation. It is to these maps that we are indebted for the valuable information that we possess today concerning the Consolidated Virginia and California mines and we are thankful that we are not compelled to use the drawings of the individual mine manager, which might or might not be correct. Incidently, this is the only case where the United States Government has ever taken an active hand as a sort of a guardian to individual and private mining enterprises.

Comstock mines were of great importance in their day. No such volume of money had ever been produced from a single source up to the time of their operations. Without question, the Comstock lode is the most extensive gold and silver deposit ever discovered in the Western Hemisphere.

Segregated ore bodies, locally called "bonanzas", carried values over widths that seem fantastic to the mine operator of today. Eight or ten feet in width, of eight or ten dollar gold ore would be commercially profitable under present method of modern mining. Yet, Consolidated Virginia broke, over a width of one hundred and fifty feet, ore that carried an average assay value of a hundred and fifty dollars a ton. There is no precedent in mining history to equal this.

Other mines also made some startling records, such as Ophir, lying south of Consolidated Virginia, when it shipped forty tons of ore to San Francisco by pack-train, for which it received $160,000.00.

Gould and Curry Mine, lying more or less in the middle of the lode, yielded $15,500,000 from a stope described by the U. S. Geologist, Clarence King, as being 400 to 500 feet in length and 80 feet wide.

The Crown Point and Belcher Mines took approximately $60,000,000 worth of ore from a single stope crossing the dividing lines of their properties, just following a period when they were both considered thoroughly worked out and were all but abandoned.

One of the most startling illustrations was that of the mine called "Kentuck". It owned but 93 feet on the lode, yet managed to extract several millions of dollars worth of ore. Its ore body was wider than it was long, which fact probably establishes a record that will not be disturbed in the future.

Mines that are best known to the public whose production ran into the hundreds of millions are: Consolidated, Virginia, California, Ophir, Gould and Curry, Hale and Norcross, Savage, Chollar, Potosi, Imperial, Mexican, Crown Point, Yellow Jacket and Belcher. There were many others.

The fortunes won from the Comstock lode have been the largest in mining history. They have passed all over this country and into Europe. They founded our extensive telegraph and cable system, the Hearst Newspaper Syndicate, and various enterprises too numerous to mention. It is reported that Mr. John W. Mackay's personal income from Comstock mines was for many months $500,000. a week.

The Comstock lode is a vast fissure whose base, or footwall is formed by the diorite country rock of Mt. Davidson, upon which it rests. The east, or hanging wall, is andesite which extends far to the east and down into the valley of the Carson River. Its length is about 22,000 feet, although the main body hardly exceeds 14,000. To the north and to the south the great vein splits, forming what are called the north and south "fish tails" and few of the mines at the extreme ends became very productive, with the possible exception of the Sierra Nevada, an extreme north end holding whose product was almost wholly gold. In width, the lode on the surface is seldom under 300 feet and somewhat midway, but toward the north it widens to approximately a thousand feet, but this width includes much barren vein matter and is not to be confused with various widths of the ore channels passing along the vent, which, of course, have no such dimensions. In depth, the width soon diminishes to two or three hundred feet and this width is frequently maintained to very great depths. As illustrative of this, the 3300 foot vertical shaft level of the Hale and Norcross mine, representing about 5000 feet in lode depth, shows quartz a hundred feet wide. Its dip rarely exceeds 47 degrees to the east and does not rise to less than 40. 45 degrees represents a fair average dip as applied to middle and north end mines, while 40 to 42 can be called an average for those toward the south. The whole interior of the fissure has long defied any accurate geological classification, particularly with reference to period of deposition.

Summed up by Professor Reid of the University of California in an address to a body of mining students, he said: "It does not correspond to any 'type' of vein and is yet an unsolved problem."

Clarence King, head of the U. S. Geological Survey, refers to the vein as a group of fissures rather than a single fissure, "whose structural outlines are quite simple, but whose details produce a complexity almost unknown in metal mines."

But for comprehensive purposes it may be described as a vast vent filled with both porphrytic and siliceous material, the latter sharply divided from the former and forming what are termed "ore channels" of great continuity and differing materially as to character. Thus we find persistently following the east wall of the lode, the soft, white, powdery quartz which has formed the great ore channel of the hanging wall and from which most of the yield of Comstock wealth has been won.

Adjacent and toward the west, lies the propylite waste, sometimes occurring in massive widths as in the case of "the great Ophir horse" and again separating the two quartz ore channels by such narrow spacing that one merges into the other as is the case in both the Gould and Curry and Savage mines. Red Quartz, harder and of a more sparry lustre, joins the wedge-like porphrytic mass in the middle of the lode, to the west and is in evidence and also important as an ore carrying channel from the Savage mine north. In both the Gould and Curry and Savage Mines, this quartz, called locally the "red lode", has been mined in widths of 80 to 90 feet and has been productive to the extent of many millions of dollars, but it has amounted to nothing of consequence in either the Consolidated Virginia or the California. The two latter mines have had their entire production in the white quartz to date. Clay, doubtless formed from the decomposition of porphrytic rock, is imbedded as a network of seams throughout the propylite filling in the fissure, while lying along the east wall is a continuous sheet of this material of various widths and not less than 20,000 feet in length.

Briefly, it may be stated that from the Belcher Mine north to the Imperial, two great quartz ore channels diverge from the surface and fill the fissure already described.

North of the Chollar Mine, the quzrtz splits into three forks. The white lode, the red lode and the Virginia vein. The latter outcrops far back into the footwall and becomes important in the Andes, Union Consolidated and other mines.

While it is well to describe these unusual conditions so that this matter can be thoroughly understood, it is with the white lode, the main ore carrying channel of the Comstock lode, that we have to deal. Because of its soft powdery texture it is easy to mine. It breaks well, stands well and, therefore, requires little timbering. Hence drifts and cross-cuts are comparatively inexpensive as much of it can be handled with the pick, but once out of the quartz and into the clay that forms its casing, ground swells and timbering becomes necessary.

While gold and silver were deposited in a variety of chemical combinations and in the Virginia vein as well as parts of the red lode some lead occurs, the main ore of the Comstock was highly siliceous in character carrying as high as 94% silica in the Yellow Jacket Mine. Its values were carried in gold incased in a miniature pyrite called a sulphret and its silver generally as the black brittle sulphide stephanite. It was an easy ore to treat and is one of the most ideal ores for flotation practice imaginable, as there is nothing to "drop"; the average percentage of concentrates in medium grade ores never exceeds 1%, hence bulk flotation and high ratios result. By simple flotation, 95% of the values can be easily recovered at mill costs not to exceed $1.50 a ton but, in the days of the operation of Comstock mines metallurgical practice was in its infancy and the "Washoe" or pan amalgamation mill, the only type ever used, saved less than 70% of the values at a cost of anywhere from $10.00 to $15.00 a ton for milling alone.

The relative proportion of gold to silver differed materially in the different mines. Generally speaking, the mines in the middle of the lode carried most silver while those on both the north and south ends carried more gold. Thus we have such mines as Gould and Curry, Savage, Chollar and Potosi, high in silver, while Crown Point and Belcher on the south carried an excess of gold even at a period when silver was worth four times its present market value.

On the north, Consolidated Virginia and California carried in its low grade ores (ores of $15.00 to $20.00 per ton in value and too low to mine at the time) a great excess of gold over silver, but as the grade increased to $150.00 a ton and more, silver slightly predominated. However, it would have been quite the reverse had these ores been mined today.

As illustrative: The California Mine alone yielded in 1876, $13,400,841.40 in bullion from 128,800 tons of ore, with an average assay value of $105.07 a ton. Of this, $6,488,640.58 was in gold and $6,912,200.82 was in silver - about half and half. With silver at its present day selling price this yield would now stand approximately: $6,488,640.58 in gold and $1,750,000.00 in silver - or about 78% gold against 22% silver. To be sure, extraction of gold was much better than silver, hence this analysis is not a fair one. On the other hand, these are high grade ores and silver has run far ahead of its average in lower or medium grade ores. . Ores in both Consolidated Virginia and California not exceeding $20.00 a ton in value always carried a great excess in gold over silver. In these days of depreciated silver values this excess is 80% to 90% gold against 10% to 20% silver.

While today we have cheap electric power on the Comstock, the mines burned wood under boilers during the entire period of their operations and when this was gone, coal was brought in at great expense. Consequently their operating costs were very high.

As the great drain tunnel (the Sutro tunnel) which drains the mines to a depth of approximately 2600 feet on the dip of the lode, was not completed until the mines had reached a great depth below it, very little benefit resulted, although now this tunnel is of inestimatable value, as the entire ore body of the Consolidated Virginia and California, the subject of this resume, is above the tunnel level and consequently dry.

In the days of Comstock Mine operation, heavy duty Cornish Pumps, lifting enormous quantities of water, required steam power that added materially to the cost of extracting the ore.

Transportation to the various mills was an added expense. At one time there were 82 mills in operation, all of which were scattered along rivers, a number of miles from the mines so that transportation of ore to them cost from $3.00 to $5.00 per ton. With these things taken into consideration, it is not surprising that mining and milling costs were so high, that only ores of a value that would seem rich to us at the present time could be mined.

The following is a resume of some of the U. S. Government statistics of the working costs of Comstock Mines at the height of their production. This book, volume 3, U.S. Geological Survey of the Fortieth Parallel, may be found in all large Public Libraries. On page 172, J. B. Hague has compiled the mining and milling costs of the Gould and Curry Mining Co. from the years 1860 to 1869 as follows:

TABULAR STATEMENT SHOWING THE OPERATIONS OF THE GOULD AND CURRY MINING CO. FROM THE DATE OF THEIR ORGANIZATION TO NOV. 30, 1869

Years Ending	Tons of ore produced	Cost per ton for mining.	Cost per ton for milling: Company Mill.	Cost per ton for milling: Custom Mill
Nov.30, 1860	-	-	-	-
" " 1861	-	-	-	-
" " 1862	8,442	$12.54	-	$38.55
" " 1863	48,743	12.54	$38.00	22.30
" " 1864	64,433	12.00	40.00	26.00
" " 1865	47,217	10.84	12.93	20.36
" " 1866	62,425	8.78	12.27	15.67
" " 1867	24,940	11.35	13.00	14.34
" " 1868	12,155	10.34	-	12.62
" " 1869	15,879	7.29	-	13.08

Thus we had over the nine year period an average mining cost of $10.82 per ton, an average mill cost for company mill of $23.24 a ton and for the custom mill, $20.36 a ton. At best, a total cost of $31.00 a ton for mining and milling and with transportation to the mills added on, probably $35.00 total cost. As the mill extraction did not exceed 67% of the values in the ore it is evident that ore in place in the mine of an assay value of $55.00 a ton, would not pay the Gould and Curry Mining Co. to extract. The Gould and Curry Mine is an average illustration. This mine lies midway on the lode, It had an ore body 60 to 80 ft. in width and at the time these figures were compiled, had not reached a depth of 1,000 ft. At no time during the operation of the Comstock Mines in their "bonanza" days, did mining and milling costs reach lower figures than $20.00 to $22.00 a ton, nor did mill extraction exceed 67% as an average with the one exception of the great ore body in the Consolidated Virginia and California Mines when ore was mined at the rate of 1100 tons a day during the late 70's. At that time total mining and milling costs had dropped to about $18.00 a ton, while mill extraction averaged between 72% and 73%. It may be stated here that as late as 1890, Consolidated Virginia and California were never able to attain lower costs or higher extractions, and throughout the lives of these two mines they were never able to make any material change in their costs or the treatment of their ore.

As 1890 was nearly the closing year of Comstock mining operations, attention is called to the fact that the report for that year ending December 30th, shows that the Consolidated California and Virginia milled 105,439 tons of ore, with an assay value of $21.00 a ton and a mill yield of $15.07. From this tonnage bullion to the value of $1,585,663.00 was obtained. This production caused a loss of over $75,000.00 in its operation.

The U. S. Geological Survey of the Fortieth Parallel on page 248, shows the following:

COMPARATIVE STATEMENT OF OPERATIONS OF 21 DIFFERENT MILLS TREATING ORE FROM THE SAVAGE MINE BETWEEN JULY 1ST, 1867 AND FEB. 1ST, 1868

Mill No.	Tons	Mill Sample	Yield Per Ton	Yield % per ton
1	5,830	$54.65	$37.86	69.2
2	6,720	55.66	38.67	69.4
3	5,109	124.25	78.16	62.9
4	3,090	50.22	32.47	64.6
5	7,334	48.34	32.95	68.1

The remainder of the mill runs, the total of all 21 mills, is here given as a whole:

Tons - 56,656. Mill sample - $56.62. Yield per ton - $38.27. % yield per ton - 67.5.

The above figures represent the treatment of third class Savage ores only. Its first and second class ore tables are also given. They show ore with a value of $150.00 and upward, with an extraction of only 54.8% on ore with a head value of $142.82 a ton. Probably Savage could not mine ore with a value much lower than its third class ore up to 1870.

As illustrative of mining ore that did not carry approximately $25.00, a ton, if any profit was to be realized, the following is a three months' run of twelve mines. These were the only mines in operation on the Comstock lode in the year of 1891, and incidently the last year of their operation.

	Tons	Bullion	Cost	Loss	Yield per ton
Belcher	3,250	$47,741.	$62,684.	$16,941.	$19.28
Con.Cal.Va.	21,340	275,496.	292,261.	14,765.	13.70
Chollar	6,765	84,520.	110,470.	25,960.	16.33
Imperial	1,135	15,041.	42,160.	27,617.	13.25
Challenge	125	1,643.	15,718.	14,075.	13.15
Crown Point	3,787	31,571.	55,650.	21,079.	14.70
Justice	2,399	41,478.	48,606.	7,128.	20.00
Overman	5,159	68,110.	74,458.	6,348.	14.46
Occidental	4,257	78,273.	75,956.	Profit	17.37
Savage	9,622	130,058.	142,278.	12,220.	14.79
Y. Jacket	4,849	64,218	90,102	35,885	18.60

It will be noted that the average yield per ton of $15.07 represents an assay value of $22.00 a ton. Considering the loss sustained by eleven of the twelve mines, ore of a value of $25.00 a ton could not have been mined at a profit.

We have in this list Belcher with a yield of $19.28 and Yellow Jacket with $18.60. This means an average assay value of over $27.00 a ton. Yet they both sustained a loss in mining ore of that grade. As Yellow Jacket lost $35,000 on the operation, ore worth $30.00 a ton could have paid no profit in the the last year of this mine's operations. Both Belcher and Yellow Jacket carry their values mainly as gold and neither have ever produced silver to the extent of the middle lode mines.

Much of the above has been written so that it may be thoroughly understood that ore worth $20.00 and $25.00 a ton could never have been mined at a profit during the operating period of the Consolidated Virginia mine. Such ore was found on the drift off the 500 foot level of the Consolidated Virginia shaft and later in the hang ing wall of the vein in a drift off the 850 feet level of the same shaft. It was abandoned, just as we would abandon ore under similar circumstances toñay that ran a dollar a ton.

It is very easy to check all statements concerning production of the mines of the Comstock lode. Not only are Government statistics available, but every week Comstock mines made detailed reports to their stockholders and these can be followed in the files of San Francisco daily newspapers, generally to be found in Public Libraries of the West.

The mines of the lode had reached a depth of over three thousand vertical feet in the 80's, which meant they were mining ore at a depth of more than 4500 feet on the dip of the vein.

Many were in good ore and doubtless would have extracted many more millions had not an incident transpired about that time that changed the entire program of the operating companies. The Exchequer, a mine that had never been among the large producers, developed a high grade body of ore on its 27th level and was in a fair way to rank high in the way of production. A water channel charged with water carrying a temperature of 170 degrees F., developed to an alarming degree and gave off so much steam that miners and pump men were forced to abandon their stations. It soon strained the overworked pumps to the extent that they were abandoned, resulting in the flooding of the Alpha, Imperial, Yellow Jacket, Kentuck, Crown Point, Belcher, Overman and Caledonia Mines. These mines have never been reopened below the Sutro tunnel level, which of course drains them. But, in the late 90's an attempt was made to reach this high grade ore body through the Ward shaft and even though a number of levels were unwatered, the project failed - mainly, it is reported, for want of money to support the work.

The Comstock Pumping Association was more fortunate and succeeded in unwatering several levels of the Consolidated Virginia mine below the Sutro tunnel level which they managed to keep dry until they had extracted over a million dollars worth of ore. Finally finding the strain too much for a single shaft - holding as they were the water of the entire lode, they were forced to pull their pumps and abandon the work, even though they mined ore of a high grade and at good profit to the end.

From that time on, nothing was done on the Comstock worthy of mention, except some sporadic leasing for high grade ore. In fact, it may be stated that that particular period practically marked the end of all company operations.

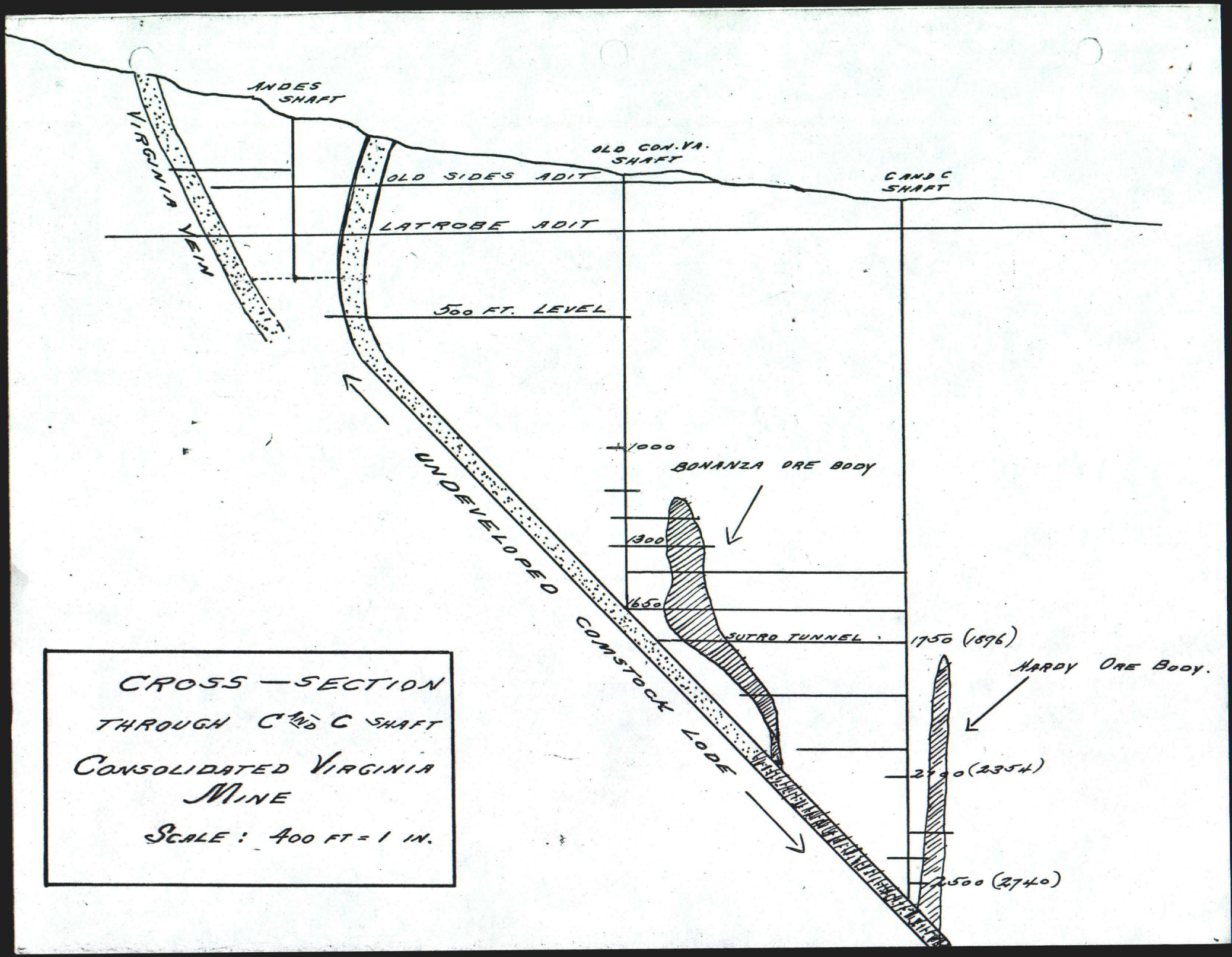
Driven back to levels above the Sutro tunnel by the flooding of the Exchequer mine, an attempt was made for several years to pay a profit by working over old ground. Had they improved on their methods and their costs, this might have been done, but milling of ores was still in the pan amalgamation stage and even cyaniding had not then been thought of. That there remains today a large tonnage of excellent ore in many Comstock mines, is easily proved by the fact that in recent months many car loads have been shipped from

the Chollar, Crown Point and Yellow Jacket mines by the Comstock Tunnel and Drainage Co., (owners of the Sutro tunnel). This work is still going on and so changed are conditions today that ore is being mined and shipped to the smelters at Salt Lake at a profit, which would not pay to mine and mill during early operations. It now pays to mine ore worth $18.00 a ton and ship it to Salt Lake City.

About 1922 an effort was made to mill old stope fills, mainly from the Crown Point, Jacket and Imperial Mines on the extreme south end of the lode. A large mill was erected at American Flat to treat these oxide surface fills. Cyanide was used as a solvent and yield a good extraction on this character of ore. However, mining operations were started on the wrong assumption that the stope fills would have a good commercial value. Much of it proves to be pure waste which had been trammed from openings made in the prophylite country rock to fill the cavities created by the extraction of the higher grade ores, which quite naturally had been completely removed.

CONSOLIDATED VIRGINIA & CALIFORNIA MINES:

In the year of 1870 neither the Consolidated Virginia nor the California were considered of any value. Up to this time the Comstock Mines had been in operation about ten years. Some ore had been extracted from the California near the surface and some crosscut tunnels, such as the Sides, Latrove and others had penetrated the lode in both Consolidated Virginia and California ground at depths of two or three hundred feet from the surface. While limited quantities of high grade ore were encountered and shipped or milled, this territory, covering some 1300 ft. on the lode, not withstanding the enormous width of quzrtz failed to show ore of an assay value sufficiently high to make a profit at that time. As has been shown nothing under $40.00 a ton could be mined at a profit during this period - 1870. Consequently, it was generally conceded that this area of the lode, even though the Ophir Mine on the north and Gould and Curry on the south were both very profitable, contained a vast body of ore, but of such a grade as to prohibit its extraction. It was decided, however, that depth might improve the situation if money could be raised to sink a shaft out on the hanging wall and crosscut back to the lode, several hundred feet under the superficial workings already mentioned. Therefore, assessments were levied on the stock of this small organization and money raised for the proposed shaft.


ANDES SHAFT
VIRGINIA VEIN
OLD CON. VA. SHAFT
C AND C SHAFT
OLD SIDES ADIT
LATROBE ADIT
500 FT. LEVEL
1000
BONANZA ORE BODY
1300
1650
SUTRO TUNNEL
1750 (1896)
HARDY ORE BODY.
2290 (2354)
2500 (2740)
UNDEVELOPED COMSTOCK LODE
CROSS — SECTION
THROUGH C AND C SHAFT
CONSOLIDATED VIRGINIA
MINE
SCALE: 400 FT = 1 IN.

Some idea of the public confidence in this enterprise can be formed from the fact that the stock in the Consolidated Virginia Company was selling for $1.62 a share, representing a value of $18,850.00 for the entire 11,800 shares issued.

The shaft started in February 1870 and was sunk 1500 ft. east of the lode to a depth of 500 ft. From that point a crosscut was run 1107 feet back, striking the footwall of the lode from which point a drift south along the footwall was carried a distance of 700 ft., or entirely through the ground owned by Consolidated Virginia. At intervals of about every 100 ft., crosscuts were run from the foot to the hanging wall, showing the width of ore throughout this 700 ft. width to average 60 ft. and at one point, over 100 ft. To the north the drift extended into California ground some 400 ft., giving it a total length of over 1100 ft., showing the same average width of ore throughout the entire distance.

During the 60's and 70's Comstock Mines left no records behind them to indicate the assay value of any ore passed through that would not pay to mine. It was not until the late 80's and 90's that anything approaching assay plans or even records of assays were made. Ore not running $40.00 a ton or more, was dismissed in their weekly statements as "low grade," too low to mine, "not high enough in assay value to extract," good looking quartz, "fine looking quartz" and a variety of different expressions, none of which help us today to determine whether such ore ran $10.00, $15.00, $20.00 or $25.00 a ton, any one of which would be profitable now. Therefore, we have been compelled to arrive at our conclusion in other ways, as this long drift referred to has been closed completely for the last 40 years.

It is said on the Comstock by those who remember, and there are a number who still do, that in these early days ore from this drift was mined and milled on two different occasions and for periods of several months each. Several winzes throughout the drift as indicated on Government maps, would encourage this belief. Assuming such to be the case and every investigation bears it out, ore of $40.00 a ton and upward must have been mined. Even though we may doubt this, there remain the dumps representing the ore extracted and thrown away as waste. Although mixed with waste from the 500 ft. shaft and 1100 ft. crosscut, they were still high enough in assay value to operate a small mill very profitably for a long period of time. This mill (the Kinkead, was an early day type and

considering its poor extraction, could have treated no ores except those of relatively high assay value. Yet it worked these dumps more than half of which of shaft and crosscut waste profitably and finally, after turning them over, left them still with a value of $5.00 or $6.00 a ton. In fact, there is sufficient value still in them to pay a profit if treated by flotation. They contain a very small amount of silver. Gold predominates to the extent of 85% to 90% of the total values.

The approximate value of ore on the 1100 ft. drift of the 500 ft. level of the old Consolidated Virginia shaft, is placed by oldtimers on the Comstock at $10.00 to $35.00 a ton. Every investigation, and many have been made, seems to bear this statement out. We cannot secure further data as there are no records of any kind to help us and for more than 40 years the old Consolidated Virginia shaft has been closed and inaccessible. If we assume the higher value given for the ore of $35.00, it would still have been impossible to have mined this grade of ore at a profit at that time. That the Consolidated Virginia Company was encouraged by what they found in the drift is evident from the fact that we find them shortly after, or to be exact, in October 1872, launched in a new program to sink the shaft an additional 500 ft. and again crosscut back to the lode where they evidently assume values would have improved. Though the shaft was sunk, the extra 500 ft., the crosscut back to the lode was never run, as a most unusual situation soon developed that placed this company on such a splendid paying basis that within two years the value of the mine had jumped from $40,000 to $160,000,000.

From the Bonner shaft of the Gould and Curry Mine on the south a drift had been run on the lode through Best and Belcher ground and was known as the 1167 ft. level. At a considerable distance from the shaft ore was being mined in this drift under great difficulty as this was some years prior to the completion of the Sutro tunnel which eventually drained this and still lower levels.

Hot water and excessive temperatures made it imperative to make some sort of an air connection if work was to be continued. Therefore, Superintendent C. C. Batterman, of the Gould and Curry Mine, suggested to Superintendent Curtis, of the Consolidated Virginia, that if he ran a crosscut out into the hanging wall about 1,000 ft., and would then sink an additional 500 ft., such a connection would be of great benefit to both and enable Batterman to return to his drift on the lode and resume the extraction of ore.

The crosscut was started and run many hundreds of feet out into the country rock, fighting extreme heat causing the cessation of work for weeks at a time so that hot water encountered in the face might have time to drain. Hundreds of feet east of the Comstock lode and approximately 300 ft. from the Consolidated Virginia shaft, now completed to the thousand foot level on the lode, Batterman's drift suddenly showed ore of high quality in its face. This was an astounding situation in view of the fact that they were a long way out in the andesite country rock where no vein had ever been thought of. Within a few feet it was reported that the ore was assaying $200.00 across the face, finally $600.00 with increasing width, eventually developing into one of the most profitable bodies of ore ever known. Extending well into California ground, this great ore tongue, in no way, even remotely connected with the Comstock lode far to the west, became so profitable, that all thought of the originally contemplated crosscut back to the lode was abandoned by the Consolidated Virginia Co.

The discovery of this great ore body was absolutely accidental although many men have claimed credit for it. Senator James G. Fair was shrewd enough to foresee the great value of this discovery and quickly together with his associates, Mackay, Flood and O'Brien, purchased control of Consolidated Virginia for less than $40,000.00. Within a very short time they had taken out more than $130,000,000.00 of gold and silver bullion. The following is a digest of the two best years of this fine ore body. These figures have never before or since been equalled.

1876	Net yield per ton	Tons mined	Extract.	Bullion	Dividends
Con.Va.	$114.50	142,678	73.25%	$16,661,940.70	$12,960,000
Cal.	105.50	128,800	73.37	13,400,841.40	8,640,000
				30,062,782.10	21,600,000
1877					
Con.Va.	95.90	144,400	72.30	13,734,019.07	8,640,000
Cal.	88.49	217,432	73.30	18,924,850.27	14,040,000
				$32,658,869.34	22,680,000

Analysis:

In 1876 Consolidated Virginia produced ore of a net yield of $114.50 a ton, receiving an extraction of 73.25%. This means ore of an assay value of $156.30 a ton to the extent of 142,678 tons.

In 1876 a yield of bullion amounting to $30,062,782.10 was realized, representing 73.30% of the value of the ore mined. Therefore, the ore mined had a value of about $41,000,000.

In 1877, the $32,658,869.34 bullion product, representing 72.80% of the value of the ore mined, shows the ore mined to have been worth about $45,000,000.00.

Highest assay value of ore mined (Consolidated Virginia) $156.30 a ton.

Lowest assay value of ore mined (California) $120.72 a ton.

It will be noted that about $25,000,000 was lost in the mills by reason of poor extraction with the methods used at that time.

It was not until 1878 that the end of this ore body could be seen. In 1879 as one follows the weekly reports, there were two opinions expressed as to mine development for the future. One favored following the ore on down on the regular dip of the lode, while the other advised returning to the original project of the crosscut to the west, never even started because of the great find which had come so unexpectedly. It all resulted in both plans being followed out, but instead of crosscutting back to the lode on the 1000 foot level, it was decided to try the 850, and at the same time continue on down from the 2000 foot level, which point the mine had reached in following the "rift" downward. Therefore, August 10th, 1879 a crossfut was started from the Consolidated shaft back to the lode, which had it reached there, would have taken them some three hundred feet under their original drift which has been previously mentioned, but bad luck followed this cross-cut from the start. Other mines had opened up greater water channels and while the Sutro tunnel was completed, its laterals had not been connected, hence it had not as yet become a drain as is the case today.

At a point 580 feet west of the shaft, work had to be discontinued, the flow of water being too heavy to continue at that point. A drift to the north was started and again a crosscut was started from it only to be abandoned as before. Again the original crosscut was started and penetrated 100 feet and actually into the

hanging wall of the vein, the reports stating it had reached "fine vein matter". But once more they were checked by water and a drift to the south started to reach a dry point. This reached 170 feet and again the cross-cut was resumed, this time cutting a flood of water in the clay casing of the hanging wall. Efforts to drain it were made with diamond drills which stuck fast and the rods could not be removed.

Probably no work ever attempted by the Consolidated Virginia Company was more difficult to carry out than this cross-cut with the exception of a drive at a later date to the east, which had to be given up entirely because of heavy water. Had this been tried a few years later when this area had been thoroughly drained by the Sutro tunnel, there could have been no difficulty of any kind. As it was, the hanging wall alone was pierced and from this, an ore of a grade impossible to mill was extracted. This is known on the Comstock as the "800 ore body" and there are a number alive today who can give much information concerning it. Apparently it equalled, but did not materially better, that found on the 500 foot level some years earlier. Nothing can be definitely established regarding its value except that it is said to run from $10.00 to $35.00 a ton - the exact figure placed on the ore of the early day drift on the 500.

The cross-cut on the 850 foot level of the Consolidated Virginia shaft, although run three years prior to the publication of the Atlas of the U. S. Geological Survey showing all workings on the Comstock lode to that date, is not shown on the maps - the reason doubtless being that it was an incomplete piece of work, did not penetrate through the lode, hence was not a working passage of the mines.

Irrespective of the difficulties encountered in running this cross-cut it probably would have been completed had not all attention been again drawn to work on the lower levels - work below the Sutro tunnel. Here profitable mining was again taking place on the lode proper, the ore following the natural 45 degree pitch of the vein. Again a second "rift" was discovered, called the Hardy vein, penetrating into the hanging wall as the original had done and yielding an additional $16,000,000 before being exhausted. From then on, work was carried on to great depth, until as previously stated, water and heat suspended operations for all time.

Now, there remains this great undeveloped block referred to, 1300 feet in length and 2800 feet deep - larger in area than most gold mines to be found anywhere - easy to work because it is drained by the Sutro tunnel below it, with nothing in the way of ore removed except what has already been told.

Ophir, adjoining on the north, produced $20,000,000 from a single stope, the bulk of which came from a horizon just about corresponding to the area lying above the 500 foot level of the Consolidated Virginia shaft already described.

Gould and Curry, Savage, Hale and Norcross and Chollar produced sixty millions on levels corresponding to the above and directly below it - all well above the Sutro tunnel. These were called bonanza stopes and carried ore of a value of $60.00 to $150.00 a ton. Altogether these stopes could easily have been placed in the area under consideration in the Consolidated Virginia.

In all the cases mentioned, there has been a great similarity in the ore occurrence. Ore of medium or low grade was being drifted on, when, for no tangible reason, values rose, widths increased and areas three or four hundred feet in length became so productive in high grade ore as to be termed "bonanzas" each of which before exhaustion, extracted ore of a value of anywhere from fifteen to thirty millions of dollars.

During recent months, arrangements have been made with the Comstock Tunnel and Drainage Company for the acquisition of the Andes shaft, at a most reasonable figure. This shaft, working on the Virginia vein, is 500 feet in depth and if a cross-cut were extended approximately 100 feet from its lowest level, the Comstock lode would be opened about 100 feet above the old 500 foot level of the Consolidated Virginia shaft and the extraction of ore could at once take place. Approximately 600 feet of undeveloped lode would remain overhead. As the shaft needs some repairing to put it in working order, it is estimated $20,000 to $25,000 would be necessary before ore could be removed.

Still another method of entering this closed territory is through the medium of the Sutro tunnel and the 1400 foot level cross-cut driven from the C and C shaft. These openings have been made of very recent date by the President of the Consolidated Virginia Company, Mr. Zeb Kendall and now offer another and probably better and cheaper method of extracting ore from this section of

the lode. Incidentally, work at these points allows a back of about 1600 feet to be stoped and trammed either through the Sutro tunnel or hoisted up the C and C shaft - the latter being in good condition and completely equipped with electric hoist and large compressor.

Harley A. Bell
Consulting Engineer.