

# Comstock Tunnel and Drainage Company

Controlling Twenty-two Mines on the Comstock Lode, Which Have a  
Production Record of Over \$200,000,000 Worth of Bullion.

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**CAPITAL 2,250,000 SHARES**

**Par Value of Shares One Dollar Each**

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*Listed on the New York Curb Exchange*

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This Corporation, which also owns the famous Sutro Tunnel, enters a new phase of mining operation by bringing under one corporate management a group of the most important mines on the great Comstock Lode—mines that have produced more than Two Hundred Million Dollars under old-time mining methods.

The reports of eminent geologists and engineers give full assurance of a new era of production from the Lode by reason of the lowered cost of gold mining operations and the vast improvement in modern gold extraction processes. (Extracts from such reports accompany this analysis.)

Long and painstaking investigations and examinations were conducted before the present consolidation was effected. These have been augmented by new exploration and by the Company's success, in 1930 and 1931, in developing a large body of relatively high-grade gold ore in the Crown Point—one of the great "bonanza" mines in the consolidated group.

Comstock Tunnel shares are intensely interesting by reason of their speculative possibilities. In addition, the ore in sight, and indicated ore, promises profits that should assure substantial dividends for many years after the mill installation now projected has been completed.

As a speculation the shares have no equal in the New York Curb Exchange mining list or in any other list of mining issues.

The management is conservative, highly reputable, and has labored for thirty years to obtain the status which now exists.

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**D. C. CATLIN & COMPANY**

**25 BROAD STREET - - - NEW YORK, N. Y.**

TELEPHONE: HANOVER 2-8026

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*Established 1902*



# Comstock Tunnel and Drainage Company

## PROPERTIES

The company, organized in 1919 as successor to the Comstock Tunnel Company, owns both the so-called Sutro Tunnel, a transportation and drainage tunnel over four miles long with laterals extending over three miles more, and the Sutro Tunnel grant, from the Congress of the United States, giving it mining rights in a strip of ground for two thousand feet on each side of the tunnel. This tunnel drains and affords haulage facilities to the various mines along the Comstock lode in Nevada. Its maximum depth is 1,950 feet below surface. The tunnel is equipped with electric locomotives and a creosoted redwood drain flume having a capacity of ten million gallons of water per day. The tunnel was built at a cost of about \$4,000,000.

The Company also owns the entire capital stock of Sutro Tunnel Coalition, Incorporated, which owns or controls twenty-two of the mines on the Comstock lode, together with fifty-six additional mining claims in the Comstock district.

Originally organized as a service company to drain the lode and furnish transport facilities for ore, with income restricted to royalties from the mines on ore produced, the Company is now owner, through its subsidiary, of about three-quarters of the mines on the lode. It has thus become the owner and operator of the great mines it was built to serve.

The equipment consists of machine shops, blacksmith and repair shops, offices, many miles of rails, compressor, drills, electric hoists, a pilot stamp mill at the tunnel portal and much miscellaneous mining equipment.

## PRODUCTION

The mines owned or controlled have a production record of upwards of \$200,000,000 to date. These mines are the following: Gould and Curry; Bullion; Savage and Chollar to the Sutro tunnel level; Best and Belcher and Potosi to the 1,000-foot level; Potosi below the 1,000-foot level; through stock control; Andes; Exchequer; Alpha; Imperial; Confidence; Challenge; Yellow Jacket; Kentuck; Belcher; Crown Point; Overman; Caledonia; New York; Alta, and Lady Washington. (See map for production of these mines.)

The mines along the Comstock Lode have produced, in the past, immense tonnages of so-called bonanza ore from lenticular orebodies of great width—widths up to 200 feet in places. Most of this production came at a time when mining and milling costs were in excess of \$17.00 per ton and when extraction was from 65% to 72%. Under present practice, mining and milling costs of less than \$4.00 per ton have been reached, with extraction of better than 90% of contained values, therefore making ore of a grade as low as \$5.00 profitable to mine.

## GRADE OF AVAILABLE ORE

There has been little mining of ore in the Comstock District since 1890, when 283,443 tons were produced at a loss of over \$3.00 per ton, although it assayed approximately \$20.40 per ton and yielded \$4,052,107, or \$14.29 per ton. At present such ore, due to much lower mining and milling costs and better than 90% recovery, would yield a very large profit. Much of it was produced from development drives put out in the search for lenses of bonanza ore, and its grade is typical of that reported to exist in wide bodies of ore, of commercial grade, in various Comstock mines on levels above the drainage tunnel level, to which reference will be made later.

## ORE IN SIGHT

The management has reported that a block of ore of commercial grade has been partly developed above the Sutro Tunnel level in the Crown Point mine since August, 1930. It was first found and explored just below surface by a tunnel run south from the Crown Point ravine. It has since been developed near the east wall of the lode for a length of over 300 feet for a height of about 250 feet, and for an average width of about 40 feet. It is estimated that over 100,000 tons are fully in sight. The exposures make it probable that the orebody contains more than 200,000 tons. The average worth of this ore is approximately \$12.00 per ton in gold and silver, with gold making up about 75% of the values.

This orebody shows a maximum width of 52 feet in one crosscut. The net value of this block is estimated at approximately \$1,250,000. Over 3,000 tons of ore were shipped during the time this development was made (1930-31), averaging better than \$19.00 a ton.

It is confidently believed that fuller development of this orebody will disclose at least 500,000 tons of pay ore in the Crown Point mine above the 500-foot level. Work in this part of the mine is being actively pushed.

Other mines owned by the Company, in which large bodies of ore of similar grade are believed by the management to exist, are the Potosi, where ore widths of 50 feet at and near the 1,300-foot level, with average values of \$10.00 to \$15.00, are reported in old workings; the Yellow Jacket, where a wide ledge of \$10.00 to \$12.00 ore has been in part developed; the Bullion, where, according to a report by an engineer of the U. S. Bureau of Mines, 64 feet of width of \$10.00 to \$30.00 ore was crosscut on the 1,720-foot level; the Caledonia, which contains over 3,000 feet of



undeveloped vein; the Overman, where 85 feet width of pay ore has been crosscut by the Lambert or American Flat tunnel, and the Crown Point, between the 500 and 1,000-foot levels, where big widths of ore of probable pay grade under present conditions were opened in the course of the exploration campaign which resulted in the finding of the celebrated Crown Point-Belcher bonanza at the 1,000-foot level.

It is the confident expectation of the management that exploration of these various areas will add many hundred thousand tons of ore to the present reserves.

### SPECULATIVE FEATURES

The Comstock Lode, as a whole, has produced to date ore having an assay value of about \$700,000,000, which has yielded, roughly, \$500,000,000 in gold and silver bullion. Some twenty bonanza orebodies were found above the drain tunnel level and a number were found below it. Two of these bonanzas produced over \$250,000,000 worth of ore, and these two were mined partly above and partly below the drain tunnel level. Roughly, 90% of the area between the drain level and 3,000 feet of depth is unexplored. It is conceded that the chances of developing great lenses of bonanza ore in this area are good. In fact, two bodies of rich ore which have not been mined are known to exist. One of these is in Exchequer, found in 1882, from which the miners were driven by water, which the small pumps of the period could not handle. This water flooded the south end mines and prevented operation in them below the tunnel level for years. Modern electric centrifugal pumps could readily handle the volume of water encountered in developments on the Comstock Lode below the drain tunnel level.

The other rich orebody referred to was discovered in 1918 by former owners of the Crown Point mine on a level 200 feet below the drain level. A fire in the mine, caused by faulty electrical machinery, necessitating flooding of the workings, prevented further development. The plans of the Company contemplate mining this ore later on.

It has, therefore, been definitely proven that rich ore goes to depths far below the drain level, and it follows that aggressive development in the deep should be richly rewarded.

The possibility of finding rich bonanzas beyond the hanging wall of the lode has also been pointed out. A geologist of highest rank has stated, in his report on this feature, that the prize, in the event of success in this sort of exploration, may be "on the order of \$100,000,000."

These features are referred to for the purpose of stressing the point that while the Company's immediate business is the winning of profit from proven near-to-surface ore of good commercial grade already in sight and ready to be mined, the probability of developing great bodies of the bonanza ore, which made the Comstock Lode famous before 1890, is not to be overlooked.

Should bonanza ore be struck again, either below the tunnel level or in the country east of the hanging wall of the lode, immense excitement and soaring stock prices would doubtless result.

From this point of view the shares of the Company are a unique and fascinating speculation.

### MILL

The Company's ores have been tested to determine their adaptability to flotation, the cheapest modern method of handling sulphide ores. Comstock ores are oxidized at surface, but become sulphide at 100 to 300 feet of depth. Tests conducted by Kraut, an authority on flotation, have resulted in yields varying from 92% to 95%, with concentration of about 70 into 1. The ores are perfectly amenable to flotation. Treatment by flotation is much cheaper than treatment by cyanidation, costs varying from fifty cents to \$1.50 per ton, according to the size of the plant employed.

Plans have been prepared for a mill to treat the ores already developed by flotation and to cyanide the concentrates, so that the Company may produce its own bullion. A contract has been offered to build the mill, so designed, for \$104,000. It is estimated that a plant competent to handle 150 tons of ore per day can be erected for less than \$100,000, and that such a plant will yield a profit, if run on Crown Point ores of average grade, in excess of \$25,000 per month. The mill will be the first unit of a contemplated plant of much larger size. Sufficient ore has been developed in the Crown Point mine alone to keep such a mill in operation for several years.

### COMPARISON OF COSTS AND YIELDS

J. D. Hague's report on costs and yields on the Comstock (see extracts from engineers' reports elsewhere in this circular) shows that during the bonanza period mining and administration costs varied from \$7.00 to \$10.00 per ton, milling costs from \$10.00 to \$14.00, and that extraction averaged less than 70%. Ore going \$20.00 per ton could not be handled except at a loss. There was then no such process of treatment as the cyanide or the flotation process under which yields varying from 90% to 97% are obtained. There was no cheap hydro-electric power, freighting was expensive and machinery could not compare with modern machinery in cost of operation or in efficiency.

Costs on the Comstock of from \$3.00 to \$4.00 per ton, depending on tonnage handled, and an extraction of better than 92% are now obtainable.

The following table shows present costs in leading gold mines with average grade of ore treated and percentage of recovery therefrom:

	Recovery per Ton.	Percentage of Recovery.	Total Cost per Ton.
Homestake (1928).....	\$4.63	94%	\$2.70
McIntyre (1930).....	8.05	95%	4.41
Hollinger (1929).....	6.09	96.3%	4.01



Indicative of the low costs obtained today on Comstock ores, operation at the Flowery mines showed actual mining and milling costs of approximately \$2.00 a ton. On a run of 34,292 tons in 1930, assaying less than \$2.50 per ton, there was a net recovery of \$2.12 per ton—cost was \$2.00 per ton—the actual net profit on the run having been \$4,115.04. This should be conclusive proof that the above estimates of cost are conservative and that the enormous tonnages of lowest-grade ores alone should produce profits far in excess of the total capital stock.

### ESTIMATED EARNINGS

Comstock Tunnel and Drainage Company has a very low share capital for such extensive property holdings, its total capital stock consisting of 2,250,000 one-dollar shares.

The earnings of the Company obviously will depend on the magnitude of the reduction plant employed. The orebody now being developed in the Crown Point fully justifies the erection of a 150-ton-per-day mill. It is expected a thousand tons per day of milling capacity will be needed when other parts of the property are developed.

A 150-ton-per-day mill, treating \$12.00 ore, will earn a safe profit of \$6.00 to \$7.00 per ton in the Comstock District, or approximately \$25,000 per month; a 1,000-ton mill, treating \$10.00 ore, should earn a safe profit of \$5.00 per ton, or \$150,000 per month.

### ORE RESERVES—ACTUAL AND PROBABLE

The following is a summary of developed, partly developed and probable ores in various mines controlled by Comstock Drainage and Tunnel Company:

1. Crown Point, new orebody surface to third winze level—100,000 tons developed and 100,000 tons partly developed. Estimated net profit \$6.00 per ton.
2. Yellow Jacket, Kentuck, Crown Point (west vein) 528,000 tons, average value \$6.75 per ton; estimated net profit \$1.50 per ton.
3. Crown Point, below third winze level to black dike, estimated probable ore 300,000 tons; grade should be similar to Block 1 above.
- Crown Point-Belcher, 500 to 1,000-foot level; tonnage and grade not calculable, but may be comparable in grade to Block 1 and may excel Blocks 1 and 3 in tonnage.
5. Crown Point-Belcher, below Sutro Tunnel level; definitely known orebody with high assay values; tonnage not calculable, but may exceed 150,000 tons.
6. Bullion—Reported vein width 64 feet; tonnage and value possibly very large.
7. Potosi—Reported vein and ore widths, at about the 1,300-foot level, of 50 feet; tonnage not calculable, but possibly very large.
8. Exchequer—Rich ore found below Sutro level; extent not known.
9. Caledonia—Overman, very large tonnage possible and indicated; estimated by engineers at many million tons.
10. Dumps and Fills—Very large tonnage available. Fills aggregating 1,272,000 tons of estimated value of \$6.17 per ton in Crown Point-Belcher alone.
11. Middle Mines Section—No estimate of tonnage included in tabulation.

Several of the mines along the lode were actively worked during the period between 1922 and 1926, but the bulk of the ore extracted and treated was taken from the old fills above the 300-foot level. The results obtained are given below (see Paragraph 8). No ore was taken out from any of the orebodies referred to in the above tabulations of ore reserves.

### DEVELOPMENT PLANS

After construction of a mill the Company will proceed with a program which should result in the gradual building up of the enterprise to one of large proportions. Immediate development plans include:

1. Equipping the Yellow Jacket shaft for use in hoisting material from the Crown Point, Yellow Jacket, Imperial area, now under development.
2. Developing, from the Yellow Jacket shaft, the large tonnage partly exposed between the surface of Yellow Jacket and Imperial and the 500-foot level.
3. Developing Crown Point and Belcher mines between the 500 and 1,000-foot levels.
4. Crosscutting from the drain tunnel level into the lode, at the Bullion and the Potosi, to develop the big widths of ore of good grade reported to exist in those mines.
5. Diamond drilling at intervals from the drain tunnel level to explore for possible bonanzas east of the hanging wall of the lode.
6. Opening the Crown Point below the drain tunnel level for the purpose of mining the rich ore reported on the 1,600-foot level of that mine.
7. Instituting a campaign of deep development to search for bonanza and other ore below the tunnel level in other parts of the lode.
8. Removing and milling, by flotation process, the enormous tonnage of low-grade—\$4 to \$5 ore—estimated at over 5,000,000 tons, from mine fills. Over 1,500,000 tons of the mine fills were taken out and milled in the period from 1922 to 1926. The cyanide process was used and bullion of a value of approximately \$6,500,000 was produced.

(\*The flotation process [which did not reach its present state of perfection as applied to gold mining until after 1925] makes for much lower milling cost than the cyanide process. Possibly \$1,000,000 could have been saved if flotation methods could have been employed at that time.)

The result of this operation definitely established the average value of the Comstock "fills" at around \$5.00 per ton under normal metal market conditions.



## FINANCIAL

The stock of the Tunnel Company, and its predecessor company, has been listed and traded in either on the New York Stock Exchange or the New York Curb Exchange for many years. The shares are now listed on the Curb Exchange. The shares are all outstanding, including a block that has been made available to furnish money for mill purposes. The Company will receive, during the next two and one-half years, funds from a contract of sale of properties in the Comstock district—a sale which has already been concluded and on which substantial payments have already been made by the purchasers. The performance of this contract will bring into the subsidiary company's treasury a very substantial amount of cash. These funds the operating company will use for further development and equipment and possibly for mill expansion as the necessity arises for larger treatment facilities.

## MANAGEMENT

The officers and directors are:

JAMES MATHER LEONARD, Virginia City, Nevada.....	President
WILLIAM C. FOSTER, New York .....	Vice-President
EMANUELE TROTTA, New York .....	Treasurer
FRANKLIN C. LEONARD, New York .....	Director
ANDREW A. SMITH, New York.....	Director
SYLVESTER GASCOIGNE, New York .....	Director
LYMAN N. CLARK, Reno, Nevada .....	Director
JAMES L. SUYDAM, JR., New York .....	Secretary

The Leonard family has been interested in the Comstock Tunnel enterprise for over thirty years, during which period control has gradually been acquired in the open market.

Mr. James M. Leonard is the general manager of the Tunnel Company and also of the subsidiary company, Sutro Tunnel Coalition.

Purchase of the mines was effected for the Tunnel Company in 1928. This purchase put the Company in control of the mining operations of the district, rounding out many years of effort to achieve this end.

## CAPITALIZATION

The Company is capitalized for 2,250,000 shares, par \$1.00. There are outstanding \$1,500,000 of 4% non-cumulative income bonds, due in 1949, representing a bond issue made to supply funds for the construction of the tunnel, which cost over \$4,000,000. These bonds are not a lien on the mines.

## CONCLUSION

While it is not intended to make a comparison with other mines—because each mine must stand on its own merits—it is proper, however, to stress the following point and to illustrate that point by referring to the experience of Alaska Juneau and its recent development into an outstanding success.

Alaska Juneau was organized to take over certain large low-grade gold properties that had been operated for years without success. Due to the application of modern methods under economic and physical conditions favorable to low cost of operation, an enormous success has been achieved in mining and milling an orebody averaging in value little more than one dollar a ton. Shares of Alaska Juneau were quoted on the New York Stock Exchange in 1924-25-26 and 1927 as low as 87½ cents and \$1.00 per share, and have since sold (in 1931) above \$20.00, an advance in six years of approximately 2,000%.

The changed economic situation at the Comstock, making for much lower mining and milling costs (estimated at \$3.50 to \$4.00 a ton, as against \$17.00 to \$25.00 heretofore) and the gain attained in recovery of metal by the flotation process to over 90%, as against less than 70% by the old process employed, makes it logical to state that a similar opportunity exists to work profitably the enormous tonnages known to exist in the Comstock district that heretofore were not possible to work profitably.

Under these vastly improved conditions in gold mining and milling, a repetition of Alaska Juneau's rise to success may confidently be expected in these world-famous Comstock Lode properties.

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**D. C. CATLIN & COMPANY**

**25 BROAD STREET - - - NEW YORK, N. Y.**

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*Established 1902*



# MAPS OF COMSTOCK LODGE

From J. H. G. WOLF, American Society of Civil Engineers

Production figures, at bottom of upper map, are the bullion output of the mines owned to 1910.

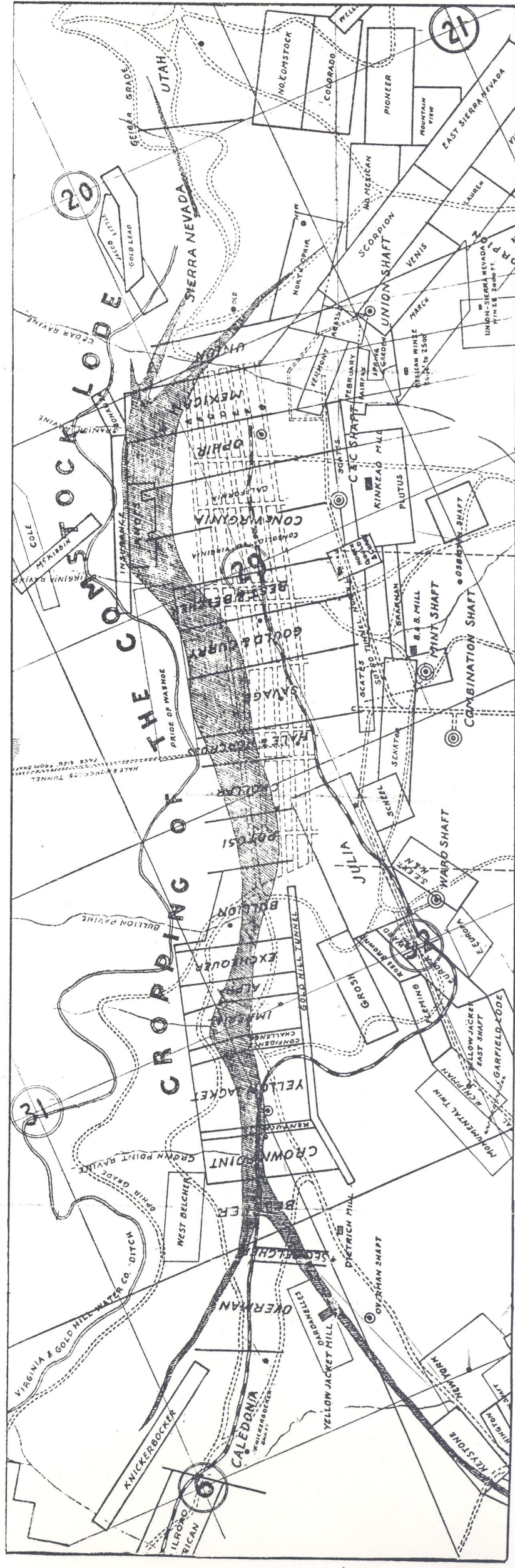
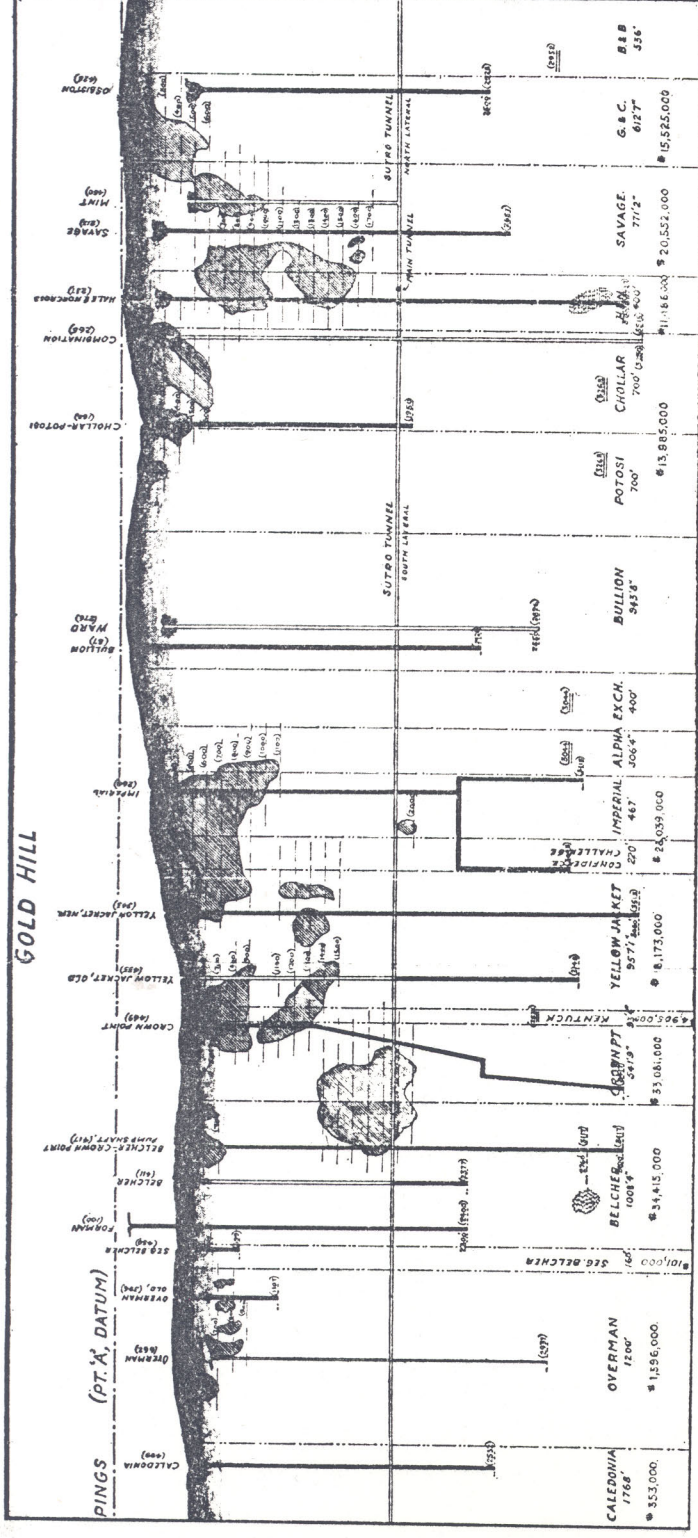
Shaded sections on upper map—worked areas.

Shaded sections on lower map—outcrop of lode.

Known high-grade orebodies shown by dotted areas on upper map.  
Unpatented claims not shown.

Lode is widest fissure vein known in world, and over two miles in length.

Shafts shown on upper map by vertical black lines; on lower map by circles.





## EXTRACTS FROM REPORTS OF ENGINEERS

### Extract from Report of Frank W. Royer

F. W. Royer is a widely known mining engineer who graduated from the Colorado School of Mines. He has had an active career as examiner for John Hays Hammond, Seeley W. Mudd, the U. S. Smelting Refining and Mining Company and other large mining interests.

Reporting on Comstock Tunnel and Drainage Company's Caledonia Mine he says:

"This block of ground to a depth of 1,000 feet should produce from 15,000,000 to 30,000,000 tons of low-grade ore with excellent chances for opening up high-grade orebodies.

"This block of ground 3,000 by 1,000 feet is the largest piece of virgin vein on the Comstock lode above the Sutro Tunnel level and the ore possibilities are enormous."

Mr. Royer estimates costs at from \$2.50 to \$3.50 per ton, and recoveries at from 90% to 94% of contained values.

Mr. Royer says of the American Flat branch vein of the Caledonia mine:

"The Lambert tunnel crosscuts the vein 400 feet from the north side line of the Caledonia. This crosscut shows a width of 85 feet of ore which assayed \$9.32\* per ton. This same orebody, on its southern course, passes into the Caledonia ground."

(\*This is in the Company's Overman ground. Comstock ores carry silver as well as gold. Mr. Royer's report was made when silver was quoted at higher prices. It is estimated that the gold content of this vein for the width sampled is \$4.50. With silver at present abnormally low prices, total values are now estimated at \$6.00 per ton.)

### Extract from Letter of Charles E. Eagan, E. M.

Mr. Eagan, a well-known engineer with many years of experience in mining in Mexico, Spain, South America and the United States, writes in 1931 as follows regarding the values in the Comstock Lode in Crown Point ground between the 500-foot and 1,000-foot levels—the area above the great Crown Point-Belcher bonanza. Mr. Eagan was formerly employed by Alvinza Hayward, who controlled the Crown Point:

"I was quite taken off my feet by what I saw in Crown Point. Here Mr. Leonard has developed an orebody some 300 feet long with width up to 52 feet, giving as a whole the astonishing assay value of \$15.00 a ton. Provided he succeeds in opening some deeper levels with equal success, I would say he will have developed the finest gold-silver orebody known in the United States; a rather tall statement, but this must be seen to be appreciated.

"In brief, it would appear that you are headed in the direction of a very big gold mining enterprise; probably one of the biggest in the country. There is a splendid orebody exposed at present in Mr. Leonard's workings and he deserves all credit for finding it. The point to remember is that you will have to shift over to the east vein at about 500 feet of depth, and, when you do, you may find the situation even better than it is where you are.

"Many years ago Col. Alvinza Hayward and I were driving in his double team from the Utica to the Densmore mine in California. I was then a young engineer in his employ. During this drive he told me the history of his work at the Crown Point mine. I cannot remember it in detail, but I do remember some of the outstanding features.

"The Crown Point had passed through a first bonanza and it was considered that no ore remained in the mine. Stock had fallen until it reached \$1.50 per share. It had previously been about \$200.00. He and John P. Jones thought that they were mining in the wrong place, and while the ore was no good under them they thought crosscuts should be driven east to pick up ore known to exist farther north on the lode and which should exist in Crown Point ground. Consequently he purchased control of the stock and took Jones in as a partner. Then they crosscut east and found the vein. It did not run as well as they hoped, but ran something, and that something was nearly good enough to mill.

"However, they were much encouraged and continued on down with what later became known as the Crown Point Incline. Another level did not bring the results, and still another and another, but always the ore was better, and they felt it would soon be of high assay value. So it went all the way down to the 1,000-foot level and then they found it, and between the 1,000 and 1,400-foot levels he told me they took out \$22,000,000.

"My mind retains the fact that when they reached the east vein there was ore. They would not have sunk on down had there not been. What is all this ore worth today? At the time ore of a value of \$30.00 a ton could not be lifted. Milling costs were \$10.00 to \$12.00 per ton. Mining costs were \$9.00 and extraction was about 69 per cent. This means that ore worth \$40.00 per ton had a profit of but \$7.00. Possibly great widths of ore—widths exceeding 50 feet—may run \$20.00. The fall in silver has not greatly changed matters. Crown Point was always a gold mine. When silver was at its highest peak gold always predominated."

(Note—Crown Point and Belcher from this bonanza, which lay partly in one mine and partly in the other, extracted about \$60,000,000 of ore.)

### Extracts from Report of F. Von Richthofen

F. Von Richthofen, the most famous geologist of his day, in his report contained in the large work on Geology of the Comstock Lode, issued by the United States Geological Survey, concludes his report, in part, as follows:

"1st. That the continuity of the ore-bearing character of the Comstock Lode in depth must, notwithstanding local interruptions, be assumed as a fact of equal certainty with the continuity of the vein itself.

"2nd. That it may be positively assumed that the ores in the Comstock Lode will retain their character of true silver ores to indefinite depth.



"3rd. That an increase in size of the bodies of ore in depth is more probable than a decrease, and that they are more likely to increase than to remain of the same size as heretofore.

"4th. That a considerable portion of the ore will, as to its yield, not materially differ at any depth from what it is at the present lower levels; while besides there will be an increasing bulk of low-grade ores. We are led to this supposition by the similarity in character of all the deposits outside of the rich surface bonanzas, and the homogeneous nature which almost every one of them exhibits throughout its entire extent."

#### **Extracts from Report of George F. Becker**

Mr. Becker was the author of the U. S. Geological Survey's famous report on the geology of the Comstock Lode and is regarded as one of the greatest authorities on the geology of the Comstock District. He says:

"The Comstock is essentially a deposit at the contact of diabase with underlying rocks, and so long as the hanging wall shows a heavy body of diabase the prospects for ore are good, mere depth not being likely to exert any prejudicial effect upon the ore-bearing character of the vein. The group of mines worked through the Union shaft and the Jacket, Crown Point and Belcher mines show peculiarities of structure which point to the likelihood of openings at lower levels. Openings such as that which contained the Consolidated Virginia and California bonanza, however, give almost no warning of their approach from above, and may at any time be struck in the intermediate mines."

#### **Extracts from Report of Malcolm MacLaren**

Mr. MacLaren is a geologist of international repute. On the subject of bonanza orebodies in the hanging wall country outside of the main Comstock channel he has the following to say:

"Since it may be assumed that the alteration of the hanging wall andesite to propylite is due to ore-bearing solutions, which in favorable situations deposit their ore content as orebodies, and since this alteration is much more marked in the Gold Hill (southern) section than in the Virginia City (northern) section, it would appear that the Gold Hill section is a more favorable locus for orebodies than the Virginia City section. In the latter section three hanging wall orebodies have been discovered, viz: the Ophir-Mexican (discovered in 1911), the Consolidated Virginia and the Potosi Strike in the Savage ground.

"On the whole, therefore, it may be assumed that the chance for the existence of hanging wall orebodies in the Gold Hill section is better than in the northern portion where three orebodies, two of which were of prime importance, have already been found.

"While the risk of complete failure is considerable, the prize on the other hand, if gained, may be well of the order of a hundred million dollars."

#### **Extracts from the Report of C. A. Luckhardt**

Mr. Luckhardt was a prominent engineer associated with the late Rossiter W. Raymond, E. M., for many years U. S. Commissioner of Mining. The Luckhardt report appears in House of Representatives Document No. 177, Dr. Raymond's report to the 43rd Congress. Mr. Luckhardt describes work done in the Bullion mine which resulted in the finding of the very wide body of ore referred to elsewhere in this description of Comstock Tunnel holdings. He says:

"The Imperial and Empire, having finished exploration in its 1,700-foot level, the Bullion Company worked 1,050 feet northeastward from the Imperial shaft in this level. This work lies 700 feet farther east and 430 feet lower than the 1,400-foot level of Bullion proper. These 1,050 feet, from Imperial, followed the 'black dike' through the Exchequer ground; and ten feet north of the Bullion south line a crosscut east was made 64 feet in length before the west clay wall was struck. This 64 feet traversed a quartzose breccia, often found on the Comstock, lying between the west clay and the 'black dike.' It assayed here from \$10.00 to \$30.00 a ton. The same material was found 30 feet wide at the 1,400-foot level of the old Bullion Incline. This brecciated belt in places shows ore fragments as high as \$180.00. It may be expected that development of this ground will develop large masses of ore."

At the time of Luckhardt's examination and report this 64 feet of \$10.00 to \$30.00 rock was not commercial ore owing to the high cost of treatment and mining in those days. Under present conditions it should be highly payable.

#### **Extracts from Report of J. D. Hague**

Mr. James D. Hague, leading engineer during the period of bonanza production on the Comstock Lode, writing on the subject of the cost of mining and milling ores on the Comstock Lode when the mines were being actively worked for bonanza ores, and on the subject of the yield obtained from the ores, said:

"It appears that the cost of merely mining or extracting the ore may vary between \$3.00 and \$5.00 per ton; that the incidental expenses necessary for the administration and maintenance of the business increase the cost, under ordinary circumstances, to \$7.00, \$8.00 or \$10.00, and beyond that amount indefinitely, according to the relation existing between the quantity of ore produced and the outlay for improvements, repairs or other extraordinary expenses.

"The expense of moving the ore from mine to the mill, and the cost of ore price paid for milling vary in general between \$10.00 and \$14.00 per ton, so that the total cost of production and reduction of ore amount to \$20.00 per ton and upwards.

"Thus the expense in the Savage during three years past has been, on the average, \$21.28 per ton, and the Chollar-Potosi, during two years, \$21.37. The average yield is about 70 per cent of the actual value contained."

Mr. Hague also said that it is believed that there are "very extensive deposits of low-grade ore in various parts of the lode, and that there is still much hope for long continued bullion production and remunerative mining industry in the existence of large bodies of ore that have remained undeveloped by reason of their low value, being too poor to pay at prices hitherto existing, but offering a good margin of profit under conditions that seem possible for the future."

This statement was made many years ago. Hague's "future" is the present time.



LIST OF MINES ON THE COMSTOCK LODE  
RUNNING NORTH TO SOUTH, WITH NUMBER  
OF FEET ON THE LODE

<u>Name</u>	<u>Footage</u>	<u>Comments</u>
Sierra Nevada	2600'	
Union	600'	
Mexican	600'	
Ophir	675'	
Consolidated Virginia	1310'	
Best & Belcher	536'	
Gould & Curry	612'7"	
Savage	771'2"	
Hale & Norcross	400'	
Chollar	700'	
Potosi	700'	
Bullion	943'8"	
Exchequer	400'	
Alpha	306'4"	
Imperial	467'	
Confidence-Challenge	220'	
Yellow Jacket	957'1"	
Kentuck	93'14"	
Crown Point	541'9"	
Belcher	1008'	
Seg. Belcher	160'	
Overman	1200'	
Caledonia	1768'	