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REPORT ON THE WEST END MINE

OF THE

WEST END CONSOLIDATED MINES CORPORATION

TONOPAH MINING DISTRICT

NYE AND ESMERALDA COUNTIES, NEVADA

Report by H. D. Budelman,
Tonopah, Nevada.

February 1, 1934.

Box 286
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707 - WO - 32928

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CLAIMS:

The West End Mine includes the following eighteen lode mining claims, all patented: West End, California, Rambler, Porcupine Fraction, Montana, Oregon, Moonlight Fraction, Utah, Arizona, Colorado, West Tonopah Fraction, South Fraction, Red Rose, Crocker, Salsberry, Taft, Protection, and Halifax No. 2. Making a total area of 214.258 acres.

In addition to the above the West End Consolidated Mines Corporation owns a controlling stock interest in the Tonopah Seventy-Six Consolidated Mining Company and the West End Extension Mining Company; and a large stock interest in the Monarch Pittsburg Mining Company; all of which companies own claims adjacent to the West End Mine proper. Claims owned by these various companies are as follows, all patented:

Tonopah Seventy-Six Consolidated Mining Company; "76", Seventy-Six Fraction, Sunrise, Wonder, Pactolus and Hart. Making a total area of 47.863 acres.

West End Extension Mining Company; Birds Eye, Birds Eye Extension, Seventy-Nine Fraction, Durham and Bank. Making a total area of 47.365 acres.

Monarch Pittsburg Mining Company; Pittsburg, Hypatia, and Monarch. Making a total area of 35.311 acres.

This makes a total area owned or controlled by the West End Consolidated Mines Corporation, in the Tonopah Mining District, of 310.086 acres, of which 290.086 acres is in

group in the central and western portion of the district, and 20 acres in the eastern portion of the district, all claims being patented.

The attached property map of the Tonopah Mining District shows the position of the respective properties in the district, as well as the position of the groups relative to each other.

LOCATION AND ACCESSIBILITY:

The property is situated in the Tonopah Mining District, Nye and Esmeralda Counties, Nevada, and is 246 miles south of Reno, Nevada, from which it is reached via the Southern Pacific to Mina and the Tonopah and Goldfield to Tonopah, the railroad station in Tonopah being but a few hundred yards from the property.

Tonopah is one of the largest towns in Southern Nevada, with a population of around 1000 at the present time, although it contained over 4000 people before the drop in the price of silver resulted in the shut down of the principal mines in the district. Elevation above sea level is 6100 feet.

TITLES AND PRESENT OWNERSHIP:

Title to the West End Mine property is vested in the West End Consolidated Mines Corporation, by United States patent issued to the West End Consolidated Mining Company, and subsequent transfer of title by deed to the West End Consolidated Mines Corporation.

Title to the other properties listed above is vested in the respective companies named, by United States patent, and control of the various companies is held by the West End Consolidated Mines Corporation through stock ownership.

HISTORY OF THE PROPERTY AND DISTRICT:

The Tonopah Mining District is so well known throughout the entire world that it is unnecessary to go into much detail regarding it.

Tonopah was discovered in April, 1900, by James L. Butler, a typical desert prospector from the town of Belmont, then the County Seat of Nye County. The first assays made for him showed the surface rock to carry from fifty to six hundred ounces in silver per ton. Jim Butler located what is now the property of the Tonopah Mining Company of Nevada, from which property probably over $50,000,000 worth of ore has been mined, and which has paid over $16,000,000 in dividends to stockholders.

By the end of 1901 about $4,000,000 worth of ore had been mined. All of this ore had to be hauled to Sodaville by wagon, 60 miles, the nearest railroad station, for shipment to smelters. The large tonnage of rich ore being shipped, which had to run over $100 per ton to pay, soon attracted the attention of the entire mining world to Tonopah and the town grew and flourished, as a typical boom mining camp.

In 1901 the property was sold to the Tonopah Mining Company of Nevada and actual development work started. By this time the country was located for miles around and other companies had been organized to prospect for ore. As the entire Tonopah District, with the exception of a small central area on Mizpah Hill, on which Jim Butlers original locations were made, is covered by later and non ore bearing lavas, these outside companies were all more or less regarded as "wild cats", their only virtue being that they were comparatively close to the area which was known to contain ore. However, several companies struck ore bearing formation, and later pay ore, by simply sinking vertical shafts through the capping lavas, and the real potential value of the district became more apparent. In 1904 the Tonopah & Goldfield Railroad Company completed its broad guage line from Mina to Tonopah, which permitted the profitable shipment of lower grade ores than formerly. In 1906 the Tonopah Mining Company completed its 100 stamp mill at Millers, 14 miles from Tonopah, and real production. Later mills were constructed by started.

the West End Consolidated, Tonopah Belmont, Montana Tonopah, Tonopah Extension and MacNamara companies. Maximum mill capacity in the district at any one time was about 2200 tons of ore per day.

As is usual in most mining camps, especially precious metal ones, Tonopah has had its ups and downs. However, production until the last few years has been fairly consistent, and the total is impressive, over $146,000,000 in silver and gold, with dividends to stockholders in excess of $35,000,000, which places Tonopah among the really great mining districts of the world.

Silver is the most important mineral in the Tonopah ores, and occurs in the consistent ratio of 100 ounces silver to one ounce of gold.

Total gross production of the Tonopah District to the end of 1939 is estimated to have been 8,168,782 tons of ore, with a metal content of 1,764,580 ounces gold and 165,643,829 ounces silver, valued at $146,403,359. An average of $17.92 per ton gross value. At the present price obtainable for gold, $35.00 per ounce, and for silver, 64.5 cents per ounce, this gross production would be valued at $168,250,569, an average of $20.60 per ton; an increase in gross value of $21,847,210, or 15%.

The West End Mine had its start with the location, on October 27, 1900, of the West End Lode, which was patented in 1902. Various companies were organized to hold and operate portions of the area now included as the West End Mine, and consolidations, purchases, and locations of claims covering areas which had been allowed to lapse, finally brought the present West End Mine property under one company's control.

The West End Consolidated Mining Company was organized May 5, 1906, at which time Mr. F. M. (Borax) Smith was elected President of the corporation. He remained in that capacity until September 2, 1926, on which date he severed his connection with the company. Mr. Smith directed the affairs of the company

during this 20 year period, and during the early years of its existence was of great service to it. He had supreme confidence in the mine and evidenced this confidence by putting his own money into the enterprise when its future was very uncertain. The mine more than justified this confidence and has made large profits. However, these profits were diverted to other channels and no provision made for the financial future of the company or development in the mine.

At the time Mr. Smith resigned as President of the company and member of Board of Directors the company was involved in extensive litigation, was indebted to the United States Government for back income and excess profit taxes and accrued interest more than $500,000, with many other smaller obligations, and had no cash with which to proceed with necessary normal development. In this condition control of the company's affairs came into the hands of Mr. F. C. Nimmis and Mr. H. D. Budelman, who had been with the company for more than ten years as mill and mine superintendent respectively.

GEOLOGY:

The following short description of rocks in the Tonopah District is offered as a preface to the more detailed description of geological conditions found in the West End Mine.

The rocks of the district are classified as of the Tertiary Period, are all of volcanic origin, and consist of trachytes, andesites, rhyolites, dacites and breccias. These occur as flows or intrusions, and are often very highly altered and similar in appearance, resulting in complex geological and operating conditions.

The principal rocks, from an economic point of view, as being directly related to the occurrence of ore of commercial value, have been designated as Mizpah Trachyte, West End Rhyolite, and the Extension and Montana Breccias.

The Mizpah Trachyte, which is classified as one of the

oldest rocks of the district, is a porphyritic rock, usually very much altered and silicified, and there has been some disposition to call it an andesite rather than a trachyte. This rock so far has been proved to contain the richest average ore, and by far the largest tonnage. It is the only container of commercial ore in the district which outcrops on the surface, the actual outcrop area on Mizpah Hill, the point of original discovery by Jim Butler, being not over one tenth of one square mile. The rest of this formation is covered by later cap rocks up to several hundred feet in thickness. The body of Mizpah Trachyte so far developed has a maximum extent of about three miles easterly and westerly, less than one mile northerly and southerly, with a maximum known thickness of about 600 feet. The actual termination of the Mizpah Trachyte is in many instances on faults so that future developments may prove a continuation in almost any direction. In fact, this condition has been found to exist in many cases as faults are solved.

The West End Rhyolite is younger than the Mizpah Trachyte and is sometimes intrusive into it. It lies under the Trachyte. It is a greenish rock, quite dense and with finely crystalline ground mass, highly silicified, and contains numerous light colored fragments as inclusions up to several feet in diameter. The West End Rhyloite contains important ore bodies, with average grade of ore lower than in Trachyte, but it is when it forms one wall of a vein that its importance is most evident. The body of West End Rhyolite so far developed is thicker and of more lateral extent than the Trachyte, with limits not yet proven.

While the Extension and Montana Breccias are considered to be different rocks, their close similarity on various occasions leads to the conclusion that they may, through more detail study, be determined to be very closely related to each other, and possibly different phases of the same formation.

The Extension Breccia occurs principally in the western

portion of the district, and its limits have not as yet been determined. It is a well defined breccia, quite siliceous, showing quartz phenocrysts, grayish to light brown in color, and contains highly altered fragments of various kinds of rock. Important ore bodies are found in the breccia but the contact with the West End Rhyolite is more favorable and one of the largest ore bodies in the district was found on this contact.

The Montana Breccia occurs extensively throughout the district, usually in the vicinity of the West End Rhyolite, on either the upper or lower contact. It is a decided breccia, quite siliceous, and the included fragments at times almost obliterate the groundmass. It is similar to, and easily confused with other breccias in the district. Some small commercial breccia ore bodies have been found but results of developments to date would not indicate that it will ever prove to be an important container of ore. Its volume is likely very much less than that of the Extension Breccia, West End Rhyolite or Mizpah Trachyte.

The other rocks of the district, which includes rhyolites, dacites and breccias, occur as flows or intrusions. Their importance lies in the fact that they cover, underlie or terminate laterally the ore bearing formations and veins, and their occurrence and identity must therefore be studied in order to prospect intelligently for new, or a continuation of old veins.

There are numerous faults throughout the district, many quite large and unsolved as yet. Aside from the fissures in which the veins were formed most of the faults were post-mineral and occurred at different intervals during or following periods of volcanic activity. In some cases these faults were mineralized and contain valuable ore, which might be taken as evidence that many of them are pre-mineral faults. As a rule faults are normal although reverse faults are not uncommon.

Rocks found in the West End Mine are typical of those found in the district as a whole, and the above description will

serve to identify the respective formations as they may be referred to in the description of veins or geological conditions as found in the West End Mine.

VEINS:

There are likely over 50 veins in the district which have produced profitable ore. Most of them are clearly of the fissure type with both hanging wall and footwall branches. Widths are not uniform, varying from a few inches to over fifty feet of pay ore. In some cases there are well defined walls, in others the walls are imaginary only and represent the dividing line between pay and non-pay ore. The veins are fairly continuous on strike and dip until interrupted by faults or later intrusions, and rich stopes have been terminated in this manner, indicating the possibility of rich ore of like grade below or beyond the interruption.

The general strike of the veins is easterly or westerly, although deviation of 45 degrees to the northwest or southwest is not uncommon, especially in the western portion of the district; and the dip may be either to the north or south.

Vein filling consists mainly of quartz with manganese almost invariably present as the oxide, carbonate or silicate. Valuable minerals are silver and gold, in the constant ratio of 100 to 1 by weight. The silver occurs mainly as sulphides of various kinds with occasional chlorides, iodides and native silver.

In the West End Mine two main veins have been developed, The West End Vein and the Ohio Vein. Both are flat dipping veins, with a southerly dip on one limb and a northerly dip on the other, roughly parallel, and from 50 to 400 feet apart vertically. These veins are large, in places over 50 feet wide of ore. The maximum width of stopes is 50 feet, and the average width over 10 feet. The major portion of the $16,000,000 production of the

West End Mine has come from these two veins and their branches.

There are several other veins, aside from the branching and reuniting type customarily found throughout the Tonopah District, which have proven large and profitable producers. These veins are usually branches of the two main veins named above, which diverge from them on their dips and do not reunite. Stopes 8 feet wide are not uncommon and the average width of stopes is about 5 feet. Average grade of ore in these veins is usually higher than in the main veins.

Reference to the attached map showing the western portion of the Tonopah Mining District will assist in understanding the positions of the various veins described below.

The West End Vein, which occurs principally in the West End Claim, was first cut in the McQuillan shaft, near the east end line of this claim, at a depth of 400 feet. The vein has a general easterly and westerly strike and dips both north and south at from 10 to 25 degrees. The north dipping limb, which is locally known as the MacNamara Vein, passes on its dip into the properties of the MacNamara, Tonopah Extension and Tonopah Mining companies, where it has been extensively developed and proven a large producer of good ore. A side line agreement with the MacNamara Company has prevented the West End Company from mining this vein branch to the north. To the south the vein has been developed and stoped far into Jim Butler ground. The West End title to this portion of the vein, through possession of its apex, having been definitely and finally established in a suit brought by the Jim Butler company, which suit was carried to the Supreme Court of the United States. To the east the vein was developed and stoped to the east end line of the West End Claim, where it passes into the property of the Tonopah Mining Company on its strike. To the west the vein was developed and stoped to the east end line of the West End Claim, where it terminated on its strike against cap rock, due to faulting or erosion, and has never been recovered to the west. Along the line of

termination, for 500 feet, the vein was wide and good ore.

The West End Vein, starting at its easterly limits in West End Consolidated ground, has a Mizpah Trachyte hanging wall and a West End Rhyolite footwall, which sometimes changes to the glassy phase of the trachyte. In the vicinity of the West End Shaft, which is approximately in the center of the West End Claim, it passes into Mizpah Trachyte both walls, and continues without change until it terminates on the west. This vein does not reach surface, its nearest approach being about 100 feet, and is covered by later cappings, known as Midway Andesite and Brougher Dacite Breccia, against which it apexes.

The West End Vein has been quite fully developed in the area described and has proved very profitable. Future possibilities are to the west and south, but conditions as at present understood do not appear favorable in either direction on the main West End Vein.

The Ohio Vein, originally known as the Lower Contact Vein, occurs in the California, Rambler, Porcupine Fraction and West End claims, and is known to extend into the Eureka and Sunset claims of the Jim Butler Company on its dip to the south. No apex rights have been claimed by the West End Consolidated as against the Jim Butler on this vein. It has, generally speaking, a northeast strike and flat southeast dip on the south dipping limb, although locally the dip is sometimes so flat that its strike may be taken in any direction. The north dipping limb ~~dips~~ forms the Murray Vein of the Tonopah Extension, and was a large producer and contained one of the largest ore bodies ever found in the Tonopah District. North of the West End Claim it passes into MacNamara ground, and the MacNamara company stoped a large tonnage from it, although average grade was not so high as in the West End and Tonopah Extension ground.

The Ohio Vein was first developed on the 800 Level from the West End Shaft, and was called the Lower Contact Vein, but in

this section the limited development showed only low grade ore and work was discontinued on it in 1912. In 1917 work was resumed from the Ohio Shaft, which had been idle for many years, and by the application of geologic principles and the driving of 30 feet of crosscut and an equal amount of raising the so called Ohio Vein was discovered on a contact between West End Rhyolite footwall and Mizpah Trachyte hanging wall. Within a few months several million dollars worth of ore was in sight in this vein. To date the Ohio Vein, which was later connected by underground workings to the Lower Contact Vein development work near the West End Shaft, has produced over $6,000,000 in high grade milling ore.

Near the West End Shaft the vein has a West End Rhyolite hanging wall and a calcite andesite footwall, but in its course to the west it passes through several contacts, at times having West End Rhyolite on both walls, West End Rhyolite as footwall and Mizpah Trachyte as hanging wall, and finally in the extreme southwest passes into Mizpah Trachyte both walls. The best ore was found where both walls were Mizpah Trachyte, or where the vein was on the Mizpah Trachyte and West End Rhyolite contact.

The Ohio Vein does not reach the surface, its nearest approach being in the vicinity of the Ohio Shaft where its highest point is approximately 350 feet from surface, the surface being covered by the later Midway Andesite and Dacite Breccia.

As previously stated the Ohio Vein passes into Tonopah Extension and MacNamara ground to the north, and in the limited exposures to the northeast it is low grade. On the west it terminates on a roughly north-south line, about 150 feet east of the Ohio Shaft, and the direction of this termination swings slightly to the southeast about the center of the Rambler claim. This termination is against Dacite Breccia on the northern portion and against Calcite Andesite on the southern portion. This vein was good ore, from 5 to 20 feet wide, and probably averages 10 feet in width along this termination for a distance of 1000 feet. It is believed

the termination was due to faulting, which is clearly demonstrated on the southern portion, but the limited development west of the fault have so far failed to disclose the faulted segment in that direction. This fault has been designated as the Ohio Fault; it has a strike of about North 25 degrees West, and a dip of 30 to 40 degrees easterly, and is believed to have a vertical throw of at least 100 feet. On the south the vein, as above stated, passes into Jim Butler ground on the 800 Level. A small amount of development work was done on the vein in Jim Butler ground, working from a flat winze, during a period when a portion of this company's property was under lease to the West End Consolidated. This work is shown on the attached map. The vein in this section was crushed and deformed by formational disturbances in the vicinity of the south side line of the West End Claim and the Porcupine Fraction Claim, and this limited work disclosed clearly a tendency to again become normal where drifted on on the 773 Level. In the southeast face of the drift on this level the vein has a Mizpah Trachyte hanging wall and a West End Rhyolite footwall, is about 6 feet wide and shows values. At the time this work was done the West End Consolidated had abundant ore reserves in its own ground, development through the flat winze was costly, and work was stopped with the idea that later on this area would be developed through a lower level. However, the lease was allowed to lapse before lower level work was started and this very promising part of the Ohio Vein remains undeveloped.

Of the subsidiary veins the most important are the Fraction Vein, South, Footwall Vein and Hangingwall Vein.

The Fraction Vein is a hanging wall branch from the West End Vein, extensively developed in the easterly half of the West End Claim, with a southeast strike and a dip of 30 to 60 degrees to the southwest. It extends into Jim Butler ground on its strike to the east, in which property it has been developed and stoped, and on its dip to the south. Apex rights have been definitely

established on this vein by the West End Consolidated.

The South Vein is a hanging wall branch of the West End Vein, which occurs in the westerly portion of the West End Claim, with an easterly strike and dip of 20 to 40 degrees to the south. This vein terminates on the west against the same capping as the West End Vein, and along the line of termination showed good ore.

The Footwall Vein is a foot wall branch of the West End Vein, which has been developed only in the westerly half of the West End Claim, with an easterly strike and dip of 50 degrees to the south. This vein terminates on the west against the same capping as the West End Vein, and portions along the line of termination were good ore.

The Hangingwall Vein is a hanging wall branch from the Ohio Vein, and is developed in the central portion of the California and Rambler Claims, with an easterly strike and a flat north dip. It terminates to the south and west against the same capping as terminates the Ohio Vein, and along the line of termination was good ore. This vein was a large producer of uniformly high grade ore.

MINING FACILITIES:

Good water for all purposes is obtained in any quantity desired from the Water Company of Tonopah, which company pumps the water from wells at Rye Patch, , and then through pipe line to Tonopah, a distance of 14 miles. Price is high but not unreasonable. No water has been encountered in any of the workings in the West End Mine.

Power for all purposes is obtained from the Nevada California Power Company, which services this section of Nevada from its hydraulic generating plants on Bishop Creek, California. Prices are high but not unreasonable.

Coal is used for fuel and is obtained from Utah mines. All necessary supplies for mining and milling purposes can be obtained at reasonable cost. Freight rates are high but not

excessive.

MINE EQUIPMENT:

Mine equipment consists of first class hoisting and compressor machinery at two shafts, all necessary buildings, electric storage locomotive, fans, bins etc.

DEVELOPMENT:

Development consists of two 2 compartment vertical working shafts, the West End and Ohio Shafts, which are 1015 and 1212 feet deep respectively; and one two compartment shaft, the McQuillan Shaft, which is used for ventilation only, is 600 feet deep vertically, with workings therefrom.

The West End Shaft has main levels on the 200, 300, 400, 500, 600, 800, 960 and 1000 Levels. The Ohio Shaft has main levels on the 300, 400, 500, 800, 1000 and 1100 Levels. Practically all the lateral work has been done above the 800 level, the attached map shows the approximate area in which development work has been done, which takes in but a small proportion of the total area of the property.

PRODUCTION, PROFITS, DIVIDENDS:

Production records of the West End Mine are not complete prior to 1909, but as near as can be determined gross production since discovery to the present time had a value of about $16,000,000.

Accurate records show production from 1909to 1929 inclusive to have been 780,826 tons, containing .193 ounces gold and 18.28 ounces silver per ton, a total gross metal content of 150,309 ounces gold and 14,271,691 ounces silver, a gross value of $18.15 per ton, and a total gross value of $14,169,832. Net profit during this period was $6.58 per ton, or a total of over $5,000,000.

Peak years were 1921 and 1922. In 1921 74,674 tons of ore was milled, with average value of $19.55 per ton, total gross

value of $1,460,160. In 1922 98,181 tons of ore was milled, with average value of $18.70 per ton, and total gross value of $1,836,303. Net profit in 1921 was $633,140.90, and in 1922 was $833,194.32.

For the 17 year period from 1910 to 1926 inclusive, every year a profitable one, 758,185 tons of ore was milled, with a gross value of $14,066,739, and net profit for the period was $5,108,817.81, or an average profit per year, for the 17 years, of $300,518.65.

In summary, the West End Mine made a net profit of $2.85 per share in the 1910 to 1926 period, of which the stockholders received $1.10 in cash dividends. For the remaining $1.75 per share earnings they received as stock dividends certain shares which, as indicated by the present market value of these shares, and against each share of West End Consolidated, have a value of approximately 10 cents; a shrinkage in value from $1.75 to 10 cents, and for which the West End Mine is in no way responsible.

METHOD OF MILL TREATMENT:

Milling practice in Tonopah is generally uniform and metallurgists of the camp have, through long experience and interchange of ideas, pretty well standardized it.

Primary crushing is done in Blake and gyratory crushers, run of mine ore being crushed to 1 1/2 inch; the ore is then delivered to the mill and fed through Challenge feeders to stamp batteries, crushing in cyanide solution to from 3 to 6 mesh; the battery product is classified in Dorr classifiers, the oversize being fed to tube mills, size 5 x 18 feet, using Danish pebbles, and ground to 75% minus 200 mesh; the overflow passes to Dorr thickners, then to agitators, where agitation is continued for 60 hours at a temperature of 115 degrees Farenheit. Cyanide is usually added at No. 1 agitator. The pulp from the agitators passes to Dorr thickners; then to a Butters type filter, after

which the tails are discharged.

Precipitation is either on zinc shavings or dust. The precipitate is melted in Monarch-Rockwell furnaces, carborundum lined, and the bullion moulded in approximately 2000 ounce bars. The average fineness of the bullion is about 10 gold and 950 silver. The bars are sent to Selbys or the United States mint for refining.

Average extraction is about 92% of the metals, 94% of the gold and 92% of the silver; about 93% of the contained values.

The West End Consolidated operated its own milling plant, of 265 tons per day capacity, and this plant was closed October 15, 1927.

Recent metallurgical tests indicate that, with the application of flotation concentration, together with improved methods of grinding and general mill practice, milling costs on Tonopah ores can be materially reduced. This is important and will result in profit from ores previously regarded as too low grade to be considered commercial.

DISCUSSION AND CONCLUSIONS:

As has been previously shown the Tonopah Mining District has been in steady production since its discovery in 1900, with gross production valued in excess of $146,000,000 in silver and gold, and has a dividend record of over $35,000,000. This latter amount does not include profits which were spent in outside exploration by the different companies. Actual profit from Tonopah operations probably exceeded $40,000,000, or approximately 35% of the total gross production.

The prosperous life of Tonopah has been longer than that of most precious metal camps, due to the complexity of geological conditions which have made it impossible to accurately block out ore reserves, which would naturally result in temporary

increased production, and which led to important new discoveries from time to time. Chief among these conditions are the following:

1.- Surface geology gave small evidence on which to predicate underground conditions, due to surface covering of later cap lavas except in the small area covered by original discovery.

2.- Many rock formations, only a few of which contained ore, which facts had to be learned through underground development.

3.- The large number of profitable veins, new ones being added to the list from time to time by discovery.

4.- Important faulting, which at times displaces whole blocks of the most favorable formations containing known veins, and at other times simply displacing the veins; the solving of such faults requiring extensive underground development at times and consuming much time.

5.- Intrusive dykes in fault zones which may separate segments of productive veins laterally or otherwise.

The decrease in yearly production in the district from 1922 to 1929 has been quite pronounced, although for the last four years production has been fairly constant at around $1,500,000 per year. This decrease has been primarily due to a decrease from the Tonopah Mining Company, the Tonopah Belmont, and the West End Consolidated properties, which properties, with the Tonopah Extension, have accounted for probably 90% of the entire district production since discovery.

It is generally regarded as true that the Tonopah Mining Company and the Tonopah Belmont Company properties have been quite fully developed, and that possibilities are limited for the discovery of any extensive new veins or ore bodies in these properties. It naturally follows that as the large known ore bodies are worked out, with no new ones to take their places, more dependence must be placed on smaller ones, with a consequent decrease in production. It is of course very probable that much more ore will be produced from these mines, and their operations

may continue profitable for many years, but it is not probable that there will be any considerable increase in their scale of operations, unless new areas are acquired in the district or developments indicate the presence of ore at deeper horizons.

Conditions in the West End Mine are entirely different. The important points of difference are these:

1.- The area included in the West End Mine contains promising undeveloped ground.

2.- Faults which have displaced veins, with high grade ore on the termination, have not been solved.

In a district of the character of Tonopah these conditions can pave the way to important discoveries which may result in as large a production in the future as in the past, and might even lead to a revival throughout the entire district.

It is interesting to note the conclusions made by Thomas B. Nolan, Associate Geologist, United States Geological Survey, who was assigned to a geologic resurvey of the Tonopah Mining District, after several months work there during the latter part of 1929. Mr. Nolan's time was spent mostly in the western portion of the district, and his examination covered the mines of the West End Consolidated Mines Corporation and its affiliated companies, as well as all adjacent properties. His conclusions follow:

> "The geologic relations that have been disclosed by the resurvey of the Tonopah District would appear to warrant continued exploration whenever economic conditions are favorable. The work has shown clearly that ore deposition occurred relatively late in the geologic history, and that, as a result, ore may be found in several formations rather than being limited to one. If future exploration is based upon the several factors that appear to have controlled ore deposition, it seems probable that such exploration will be rewarded by new discoveries of ore."

There are several sections of the West End Mine which justify development, those listed below are considered the most favorable:

1.- The portion of the Ohio Vein which has been described

as dipping into Jim Butler ground. This should be developed by a south crosscut on the 960 Level, starting near the southwest corner of the West End Claim, and raises driven to the vein at intervals of 100 feet or less. This work, in addition to developing the downward extension of the Ohio Vein, would crosscut new territory and might open entirely new veins. A fund of $20,000 should be provided for this work.

2.- The faulted segments of the Ohio and Hangingwall Veins should be prospected for on the 800 Level, and conditions as shown in this work might make it advisable to do additional work on the 960 Level. This is very important work and the faulted segment of the Ohio Vein a prize worth striving for. As stated the Ohio Vein showed good ore, which would average 10 feet in width for a distance of about 1000 feet along this termination. A fund of $20,000 should be provided for this work.

3.- On the 500 Level from the McQuillan Shaft an occurrence of low grade ore in West End Rhyolite was disclosed in a short west drift about 1908, and no other work has ever been done on it. This has been designated as the 539 Vein, but it is believed to be the Footwall Vein, on which some development work was done about 1000 feet west of this showing. A fund of $5000 should be provided for this work.

4.- The bottom of the Ohio Shaft, at 1212 feet depth, is in rock which has the appearance and chemical characteristics of Mizpah Trachyte. No work has been done on it, the deepest level from the shaft being the 1100 Level, which is a short piece of work. It was always the intention to return to the shaft bottom and do some work on the 1200 level but during the period of rush production there was no opportunity to do this work, and when rush production was over there was no money available for it. This is important work for which a fund of $15,000 should be provided.

5.- There are many other minor pieces of development which might yield quick results, but the above offer the best

chances for real important developments.

In addition to mine production on company account it is planned to lease some of the old stoped sections of the mine on a royalty basis. With the favorable gold and silver prices an uncertain but profitable production should result from this work.

No mention has been made of any work to be done in the properties of the West End Extension and Tonopah Seventy-Six Companies, which companies are controlled by the West End Consolidated through stock ownership, as this work is outside the West End Mine proper and will likely be more costly to complete. Mining conditions are now so difficult in this territory, on account of the long distance from a working shaft, with consequent bad ventilation and excessive operating costs, that a new shaft is advisable. Before starting this work funds should be provided for a new 2 compartment vertical shaft 1000 feet deep, and for 2500 feet of development work, which will cost approximately $75,000 to complete. Interest in these properties is considered a very valuable asset of the West End Consolidated Mines Corporation.

In conclusion: I feel that the West End Mine is a valuable one, well worthy of a campaign of development along the lines suggested above, and I recommend the raising of a development fund of $75,000 to carry out this work.

Tonopah, Nevada.
February 1, 1934.