

drill. The air supply for North Lake is obtained from the Cliffs Shaft Mine through a six inch pipe line, three and a half miles long. The operation of two pumps in both No. 1 and 2 shafts, with seven drill machines, consumed more air than the line could carry and maintain a pressure above 65 lbs.

In October four days were lost on account of a fatal accident, and a number of new men were hired from which it was impossible to obtain good results until they had become familiar with the work.

At a depth of 400 ft. below the collar it was decided to cut another ring around the shaft and open out on the West side for a pump house. This was made necessary by the water which amounts here to seventy five gallons per minute, and which has been seriously affecting the miners health. An electric pump has been ordered and received, which will be set up at this pump house, and it is hoped to catch at least seventy five percent of the water here by means of a concrete ring behind the timber. The balance of the water can be handled by a small pump at the bottom of the shaft and pumped to the sump. In cutting out for the pump house considerable trouble was experienced due to the soft material which occurs between the slips and upon which the air acts, causing the ground to break off sometimes 15 or 20 ft. away from the hole. In this manner almost one third more ground came out from the pump house than was necessary. The cut was made on the West side of the shaft 24 ft. in depth; the last 16 ft. has been excavated to a depth of 8 ft. This will give the sump a capacity of over 10,000 gallons, which on a basis of seventy five gallons per minute will provide a capacity of about two and a half hours. It is planned to only pump this sump when it becomes full, in order to cut down the expense of operating the electric pump.

During the year the shaft has been cased from the ledge to within thirty feet of the bottom. Cage runners have been put in from the surface to the bottom set of timber and permanent rollers have been carried to within thirty feet of the bottom.

The quality of labor available in the North Lake District thus far

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has not been good. It has been particularly so at No. 1 Shaft which has been very wet. A total of fifty eight different men have been employed here, frequent changes being necessary.

#### NO. 2 SHAFT.

The first of the year this shaft was down 140 ft. below the collar. In January the sump and concrete ring around the shaft, 100 ft. below surface were put in, and about eighty percent of the water was caught here. In February the first level plat was cut out at a depth of 200 ft. and a drift driven in 12 ft. South of the shaft. Bearers were put in at this point and sinking was continued. In March the melting of the snow on surface caused the shaft to again become very wet, proving a serious hindrance to sinking operations. In May, the second or 350 ft. level was reached. In July the shaft was sunk only 4 ft., as the men were engaged in opening out the second level. No sinking at all was done in August, but in September the shaft was sunk 23 ft. The rest of the month the men were busy cutting out an eighty ton storage pocket and in driving the drift North and South of the shaft. Since September the shaft has been sunk 39 ft., and is bottomed at a depth of 435 ft. below the collar, or 85 ft. below the second level. At a depth of 412 ft. a pump house was cut out to the East of the shaft, 18 x 14 x 9 ft. in size. The last 23 ft. of the shaft constitutes a sump. In order to increase the capacity of the sump, a small cut was made on the West side of the shaft giving it a total capacity of 50,000 gallons, which on a basis of a flow of 250 gallons per minute, will provide a storage capacity of three and a half hours. The flow is now about seventy five gallons per minute, which gives the sump a storage capacity of eleven hours. The water is now handled by the electric pump which has a capacity of 400 gallons per minute, and which is run for about one hour and a half out of every ten.

The storage pocket on the second level, of eighty tons capacity, required the removal of a large amount of ground. This work has been completed, and in December the pocket was installed. The auxiliary or measuring pocket which holds one skip, remains to be built before the skips can handle dirt from

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from the second level. On the first level a slide has been built to handle the broken dirt, as the tonnage of ore above this level was <sup>not</sup> large enough to warrant this expense. This slide has been practically completed except for the lining plate and the doors. The rock from the first and second levels has been handled by cars on the cage since early in December; the cars are hoisted to the top landing of the shaft and trammed by hand over the rock trestle to the rock dump. The casing of the shaft is practically completed, and all preparations have been made for installing the skip runners.

Since July sinking operations have been carried on in conjunction with the drifting. On the first level the rock broken in the drifts was hoisted while the shaft was being drilled, and the shaft rock hoisted while the drift was being drilled. This proved somewhat of a hindrance to rapid sinking, but at the same time it was possible to drift into the ore body.

This shaft was planned to be 650 ft. in depth. At this point a drift would be driven to connect with No. 1 Shaft, 1300 ft. distant. Owing to the large tonnage of ore available above the first and second levels, it was decided to stop sinking and later on to drift from No. 1 Shaft and raise No. 2 Shaft. This would enable mining to be started much sooner at No. 2 Shaft and would also decrease the cost of the 265 ft. remaining to be sunk.

The developements on Section 6 would indicate that this shaft will eventually be sunk several hundred feet deeper to mine the ore body which has been shown up by Diamond Drilling during the past year.

ESTIMATE OF ORE AT NO. 2 SHAFT, BASED ON DIAMOND DRILLING.

	Bessemer	Non-Bessemer	Silica	Total
1st Level	165,000		388,200	553,200
2nd Level	335,000		729,640	1,064,640
Balance	<u>400,000</u>	<u>400,000</u>	<u>64,540</u>	<u>864,540</u>
	900,000	400,000	1,182,380	2,482,380
			Iron	Phos.
	Bessemer		60.85	.042
	Non-Bessemer		58.54	.162
	Silica		51.50	.050

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## 1st LEVEL DRIFT, NO. 2 SHAFT.

The first level of No. 2 Shaft as originally planned, was to be a timber drift and also to provide ventilation for the sub-levels above the second level. A re-estimate of the ore in No. 2 Shaft was made in July, at which time it was noticed that there was a large tonnage of ore averaging about 50% Iron and .060 Phos. available above the first level. It was decided to mine this ore and this rendered it advisable to make the first level into a working level.

While sinking the shaft a cut had been made for a distance of 12 ft. South of the Shaft on the first level. Drifting was continued, the drift being carried 8 ft. in width. At a distance of 100 ft. South of the shaft the drift was turned to the Southwest, as this was the most direct line to the ore shown up by diamond drilling at this end of the deposit. On the 10th of August drifting was temporarily stopped, the drift at this time being in a distance of 363 ft. from the shaft. The miners were moved out to the shaft and the drift was widened to double track width for a distance of 100 ft. South of the shaft. A cut was also made for a distance of 15 ft. to the West of the shaft for a slide. Later the Southwest drift was continued, and a low grade ore encountered at a distance of 350 ft. from the shaft. This ore did not average quite 50% in iron so no efforts were made to save it. After driving 75 ft. in this ore, high grade ore was encountered in November, and drifting was abandoned here until arrangements were completed for handling the ore on surface. In September the Southeast drift was started at a point 75 ft. from the shaft and headed for the ore at the East end of the deposit. This drift is now in about 300 ft. from the shaft and within 150 ft. of the ore body.

The ground was removed for the slide in November, and the slide was built in December. The permanent tracks are being installed on this level, and also drainage ditches carried to the pipe line in the shaft, from which point the water is carried to the sump at the bottom of the shaft. As soon as it is possible to hoist ore from this level, the working force can be rapidly increased in the Southwest drift, where a number of raises must be started to reach the top

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of the ore where the sub-levels will be opened out.

#### 2nd LEVEL DRIFT, NO. 2 SHAFT.

The second level was opened out around the shaft and the ground removed for the storage pocket by the shaft crew. As motor haulage is to be used on this level, a drift was driven 75 ft. North of the pocket to provide tail room. The main drift to the ore has been driven due South of the storage pocket in a line about 12 ft. West of the shaft. This drift is now 125 ft., and as sinking is finished, can be pushed rapidly towards the ore body.

#### DISTRICT SHOPS.

The contract for the district shops was given to the Foster Construction Company the 1st of October, and completed in February. The machinery from the dismantled Iron Belt Mine was received and installed in the Machine Shop, which went into commission in the latter part of July. Since this time practically all machine work incidental to opening and equipping the mines has been done at North Lake. In this shop there are employed one machinist and two helpers, and at times the work has made it necessary to use two additional men. The Blacksmith Shop is equipped with a drill sharpener, a drill sharpener furnace, steam hammer and two forges. One blacksmith, a helper, and a drill sharpener were employed until in the summer, when it was found impossible to get the work out and another blacksmith was employed. The Carpenter shop is ready for use, but as yet no equipment has been installed. The various shop buildings are lighted by electricity, steam heated by live steam from the Boiler House, and present a neat and attractive appearance.

In the center of each building there is a track laid in the concrete, leading to a turn-table in the Machine Shop. From this turn-table the tracks run in a straight line through the basement of the Engine House and on through the tunnel to the collar of the shaft. All material such as motors, motor cars, underground mine cars, pumps, drill machines and drill steel can be taken on this track and diverted to any of the shops.

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## NO. 1 ENGINE HOUSE.

No. 1 Engine House which was included in the contract given the Foster Construction Co., was built at the same time as the shops. The foundation for the cage hoist was put in in March and the hoist was erected in April. On the completion of the Engine House floor, which is of re-enforced concrete resting on eight inch iron columns, the electrical equipment for the hoist was installed. The hoist went into commission in the middle of July, and with the exception of a few delays caused by the automatic switches, it has worked very satisfactorily. It is now thought that this trouble has been definitely located, and that it can be guarded against in the future. It is equipped with two brakes, one a hand and the other an air brake. With the light load it now has, it was found that it would operate very easily with the hand brake, and the power brake has not been used. The concrete floors have been given three coats of floor dressing which has proven very satisfactory, preventing any dust due to wearing of the floor. This building is electric lighted and steam heated.

## NO. 2 ENGINE HOUSE.

At the close of the year 1909 this building was completed with the exception of the gable ends and roof and other carpenter work. All the carpenter work was completed early in the year, and the concrete floor in the basement was also put in. No work was done at this building for several months, but after the cage hoist had been installed at No. 1 Shaft, the forms were moved to this building and the foundations for the skip hoist was put in, also for the cage hoist. These hoists were received in the spring and were installed early in the summer, after which the concrete floor for the main engine room was put in. The electric equipment for the above hoists was then installed, and on the completion of the surface pole line from No. 1 Shaft, the final connections were made. The cage hoist went into commission on the 18th of August, and except for a few hours delay on the start, it has worked very satisfactorily.

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The permanent Heating Plant was installed in this building in October. Steam was also piped to the temporary dry, and the plant has been in constant use since, proving entirely satisfactory.

#### MINE OFFICE.

This office was occupied the last of November, 1909 and has been used since. The water supply was not piped to the building until late in the summer, and until the new dry is erected, hot water will not be available. No grading was attempted at this building during the summer, as Mr. Manning has not submitted any plans for this work.

#### TRANSFORMER SUB-STATION.

In November this building was authorized and construction has been started by the Company. The plans of the building were prepared by Viele, Blackwell & Buck, Consulting Engineers. It is 27 x 36 ft. in size, and is of brick, steel and concrete construction. The brick work was finished early in December, and the concrete roof was put on the last of the month. The doors and windows have been received and part of them are now in place. The concrete floor must be put in, and next summer a tar roof will be placed on top of the concrete roof. This building is located near the district shops, and with them and the dry will form a quadrangle.

#### NO. 1 SHAFT HOUSE.

The steel shaft house was erected in March by the Worden-Allen Co., contractors. On completing the steel shaft house they erected the steel pulley stands, two in number. The wooden lining of the pockets has been put in as also the floor of the upper landing, which is 40 ft. above the collar. No further work will be done at this shaft house until next summer, when it will be put in condition for production.

#### NO. 2 SHAFT HOUSE.

The erecting crew which put up No. 1 Shaft House also erected No. 2 Shaft, this work being completed in April, after which they erected the two stands pulley between the shaft house and the Engine House. The Company carpenters

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started work at once at the shaft house installing the lining of the pockets and the skip dump, and also completed all other wood construction. The loading pockets have been lined with 3/8" plate, and all preparations completed for handling ore on surface as far as the shaft house, pockets, etc., are concerned.

#### NO. 2 SHAFT, TOP TRAM EQUIPMENT.

The electric motor driven engines for the ore haulage on the stocking trestles have been received and the motors are now being set in position and bolted to the engine frames. These engines will be placed under the landing floors of the shaft house on the line of the rope haulage, and will be supported by timbers resting on the braces of the steel shaft house. The controllers will be located in the top landers house and in this way it is expected to save the wages of an engineer, at least until the mine is producing near full capacity. It is planned to build the top landers house 9 x 12 ft. in size, of brick, with a concrete floor and roof, making it warm and absolutely fireproof. It will be heated with a small stove. This building will also contain the puff used to pull back the rock car. During the development period two men will be able to handle all the cars on the trestles. The spools, rollers, wire rope, etc., are all on hand, and this equipment will be installed as rapidly as possible.

#### TRESTLES, NO. 2 SHAFT.

The permanent rock and ore stocking trestles have been erected at No. 2 Shaft. In order to avoid rotting, the sills of the rock trestle have been set on small concrete piers about two feet above the surface of the ground. The railroad loading tracks pass beneath the ore trestles, and if sills had been used, it would have been necessary to bury them beneath the tracks, so it was decided to set the legs on concrete piers anchoring them to the piers with a one inch bolt which was imbedded in the Concrete. Owing

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to the ground which was low, all the legs of the East trestle were set on concrete piers. The West trestle which extends across the rock fill, which is 10 ft. in depth, has the trestle legs near the shaft set on piers, while on the remaining ones the sills are supported by small concrete piers. The permanent tracks have been laid on this trestle, and a substantial railing put on the sides. Electric light wires have been carried to the trestle and all wiring completed for lighting when production starts.

On the East side of the shaft six bents of the stocking trestle have been erected. This was deemed sufficient to stock what bessemer ore would be hoisted during the winter of 1910-1911. On the West side only four bents have been erected out of six which were planned, owing to the lack of some material. It is planned to stock the Silica ore on the West side of the shaft, as there is room for a large tonnage here, in fact it would be possible to stock here for at least two years without removing any of the ore.

#### TIMBER TUNNEL NO. 2 SHAFT.

A timber tunnel has been constructed at No. 2 Shaft for a distance 175 ft. to the North where it opens out into the valley through which the L. S. & I. main line is constructed. The floor of this tunnel is ten feet below the surface at the collar of the shaft, the main part, however, being only about six feet below the surface of the ground. A three-rail track has been laid in the tunnel giving two gauges, one of eighteen inches for the timber track on the first level, and one of thirty inches for the timber track on the second level. This was necessary, as hand tramping will be done on the first level and motor haulage on the second.

#### TEMPORARY BUILDINGS, NO. 2 SHAFT.

The temporary Engine House at No. 2 Shaft was used until the electric hoist went into commission, after which the temporary hoist was removed from the building, and the building was moved over near the dry house which later burned. The temporary heating plant was set up in this building and had just gone into commission when the fire occurred. The Heating Plant was then removed to the basement of No. 2 Engine House, and this building is

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now used for a store house for tools and supplies for the mine. A new temporary dry has been built near No. 2 Engine House. This dry has hot and cold water, is steam heated, has steel wash troughs and is electric lighted. It will be used until the permanent dry is erected in the summer of 1911.

The temporary barn, which is a remodled hay barn purchased of the former leasor of the forty acre tract where No. 2 Shaft is located, has been used for the mine teams. It has accommodations for five horses, is electric lighted and has water supplied from the water system.

#### TEMPORARY BUILDINGS, NO. 1 SHAFT.

The temporary Engine House at No. 1 Shaft was abandoned when the electric hoist went into commission, and has since been used as a store house for material used in sinking. The other temporary buildings at this shaft are utilized as store houses for cement, steel, oil, blacksmiths' coal, etc. It will be necessary to continue to use them for this purpose until permanent buildings have been erected.

#### FIRE.

At 3:30 A. M. September 20th, the temporary dry at No. 2 Shaft burned to the ground. It was a frame building 16 x 50 ft. in size, and was filled with the miners oily clothes which caused it to burn very rapidly. The miners at No. 1 Shaft happened to be on surface preparing to blast when the fire broke out, and they immediately got out the hose cart, but it was too late to save the building. They were able to save the temporary heating plant which was about twenty five feet distant from the dry, and also put out the fire which had caught on the rock trestle. Temporary quarters were provided for the men in the temporary heating plant, but this building was too small and it was decided to erect another temporary dry. The burned building was insured and a settlement was made with the miners, allowing them part of the cost of their outfits.

#### CLEARING LAND AND GRADING.

The grading of the stocking ground around No. 1 Shaft, and which in-

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cluded the grading of the West stocking ground for No. 2 Shaft was nearing completion the first of the year. The ground around No. 1 Shaft had been filled to grade and the timber yard was being filled. This latter work progressed slowly owing to snow and the frequent moving of the tracks as the filling only averaged from four to six feet in depth. On the completion of the timber yard filling, a trestle was built into the swamp on the line of the Railroad and the remaining ground was dumped here. Considerable trouble was experienced with frost, particularly in the early part of February. It was necessary to blast about every four feet, holes being made in the ground with red hot bars, blasting being done while the train was dumped; sometimes as many as fifteen holes were blasted at one time. There was also some trouble experienced with the shovel, which was an old one, and frequent delays were necessary for repairs. Work was completed on the 14th of February, and as there was a rental charge on the locomotive, cars and shovel, it was necessary to move them to the C. & N. W. Ry. three eighths of a mile North of the Mine as soon as possible and return them to their owners. This work was pushed with all possible speed, but owing to a heavy fall of snow which came just as this work was started, considerable difficulty was experienced in moving the outfit. The snow plow was used to plow out the line, but owing to the uneven surface of the ground considerable shoveling had to be done, it requiring eight days to complete this work and get the outfit into Ishpeming. There was a total of 97,814 yards of dirt moved in this work, of which 21,535 yards is considered as work done for the L. S. & I. Ry.

The East stockpile ground at No. 2 Shaft has been graded for a distance of 300 ft. beyond the permanent trestle. This ground had been previously cultivated so that it did not require a great deal of leveling; it was necessary to make a one foot cut on the South side and a corresponding fill on the North. The West stocking ground which was included in the steam shovel grading operations, required a slight leveling of the surface in order to lay the plank. One hundred thousand feet of three inch Hemlock has been laid on these two stocking grounds.

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## SURFACE AIR LINES AND RECEIVERS.

Two boilers were purchased from the dismantled Iron Belt Mine, to be used as receivers. They were shipped via the C. & N. W. Ry. which is three eighths of a mile distant from the mine, and owing to their weight it was impossible to move them during the summer season. After the snow fell in the fall they were moved in to the mine and located on the South side of the stocking grounds between No. 1 and 2 Shafts.

The surface lines have been changed and enlarged, the 6" line from the Cliffs Shaft being extended to the tunnel connecting No. 1 Engine House to the shaft. The line at this point passes into the tunnel, from which point it branches to the shaft and to the shops. The receivers are placed about 400 ft. apart and are connected by a 6" line, and from the receiver nearest No. 2 Shaft, a 4" line will be carried to the collar of the shaft and connected to the 4" line in the shaft, which has already been installed. The work at No. 2 Shaft has not been completed, as the pipe which was ordered in October has not yet arrived.

## LOCATION.

During the past year the first group of ten houses have been inclosed with fences. These fences are constructed of 1 x 6" pine boards and cedar posts, with a 4 x 4 laid on the diagonal to form the top of the fence. The fences are only about three feet in height, and have been stained a dark brown, creosote being used for this purpose. The single and double gates used here are built on a design furnished by Mr. Manning, they having spring latches and hand made hinges fitting in the fencing scheme very nicely.

This first lot of houses have been painted, five different colors being used, alternating light and dark. Cess pools have been dug for all of these houses as well as for the second lot of ten double houses, and all the necessary piping done. Since the first group of houses have been fenced and painted, they present an attractive appearance, this being due in a great measure to the large number of spruce and pine trees which were left in the

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yards.

The second lot of ten double houses was authorized in August, and construction was started the following month. These are located to the Northwest of the first group, and the roads constructed in 1909 will pass by them. The ground is comparatively level and free from trees, so that very little clearing and grading will be necessary. These houses have been completed except for the outside painting, which will not be done until next spring. Water has been piped to the houses and the cess pools completed so that they can be occupied as soon as the forces are increased at the mine.

#### WATER SUPPLY, LOCATION AND MINE.

In 1909 a tank of 300,000 gallons capacity had been constructed and practically completed. A 6" wooden pipe line had been laid a distance of 2000 ft. to the location, and a 4" line laid through the location. Trenches were dug for a distance of 2000 ft. to the mine and about 400 ft. of 4" pipe laid. Throughout the winter a supply was obtained for the Company houses by diverting water from a diamond drill pump station into the wooden pipe line. In May it was decided to use a spring located 1600 ft. Southwest of the concrete tank as a source of supply for the water system. A shaft 16 x 16 ft. inside dimensions was sunk 15 ft. to ledge at a point about 30 ft. from the spring and the water piped to it from the spring. This tank or shaft holds 20,000 gallons. The flow from the spring at this time amounted to about seventy five gallons per minute. A 6" wooden pipe line was then laid from the spring to the storage tank. A small brick pump house was erected near the spring, in which the electric pump was placed, and a cover built over the tank. In September this plant went into commission. The electric pump was run for about forty minutes in the morning and thirty minutes in the evening, about 30,000 gallons being pumped every twenty four hours. This was considerable more than was used at this time, but as the tank was empty when this work started, it required sometime to fill it.

In October the pumping plant of the diamond drill operating on

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Section 6 was disconnected and a 4" suction laid to a spring fed lake about 500 ft. from the spring, and a 4" discharge carried to the sump of the electric pump. Connections were made to the wooden pipe line to the location in order that the diamond drill might get water from the water system. The drill uses from 20,000 to 40,000 gallons per twenty four hours, and it has been found necessary to operate the steam pump about one day a week in order to keep the tank filled. This arrangement is merely a temporary one, as it will not be necessary to use the steam pump after the drilling is finished. The drill was located over 2000 ft. from the pump station, and it was necessary to operate it on both day and night shift. Even this would not have prevented the line from freezing in the winter weather. The flow of the spring has decreased somewhat with the cold weather, and not more than 20,000 gallons are supplied in twenty four hours as against 30,000 in the fall. Even with this decreased flow there is plenty of water for the location and mines until such a time as the location has more than trebled in size.

The wooden pipe line has been laid from the storage tank to the mine and connections have been made to the various mine buildings. One fire hydrant has been placed near No. 2 Shaft, one near the Boarding House and one near No. 1 Shaft. No leaks have developed in this line, and no trouble is anticipated from this cause. After the authorization of the second lot of location houses, the water system was extended so that they could be supplied. At this time a return branch was laid from the interior street of the location to tap the main 6" line. This does away with a dead end and permits a free circulation of the water in both directions. House connections have also been made for the new location.

The ground has been leveled around the storage tank and the timber removed for a distance of 60 ft. This latter work was done to prevent forest fires from approaching close enough to destroy the roof.

#### FATAL ACCIDENTS.

One very serious fatal accident has occurred at the North Lake Mines,

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in which four men were killed at No. 1 Shaft. The accident occurred at 6:20 P. M. October 17th, and was caused by the men being thrown from the rim of the bucket on which they were riding to surface. The cross-head hung up in the shaft at a point 160 ft. below surface and dropped a short distance meeting the ascending bucket, the shock being sufficient to throw the men off.

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On July 17th, 1909, a lease was taken from the Barnes Land Company, on the Northeast quarter of Section 3, and in November estimates were prepared for opening a mine. Actual work started on the 5th of December, the ground being cleared for the location of the shaft and buildings. A number of stand pipes were put down to the ledge to determine the best site for shaft, and from the knowledge thus gained, a location was decided on. Test pitting was done at the four corners, the depth of the ledge being 13 ft. 9 ft. 3 ft. and 6 ft. The ledge in the stand pipe holes varied from 38 ft. to 58 ft. below the surface except in the last hole where it was 23 ft. The holes showed the ledge to dip to the South, the site of shaft came on the side of a hill, and before actual sinking could start it was necessary to make a cut into the hill and level the ground around the collar of the shaft. The ground was removed down to the ledge in the shaft, and some rock was taken out by hand drilling while the derrick was being erected.

In March a diamond drill boiler was set up near the shaft to furnish steam for a small puffer and also for a drill machine. The shaft was worked on single shift during this month, and was sunk to depth of 22 ft. After sinking 18 ft. deeper, hitches were cut at a point 19 ft. below the surface. Nineteen sets of close timber were then put in, these sets being for a full sized standard shaft, 10'10" x 14'10", in size. Below these bearers the shaft was made 10'10" x 11'1" in size. Sinking was continued and in August the first level was reached at a depth of 150 ft. This level was then opened out for a distance of 40 ft. North of the Shaft and the ground removed for a slide, after which sinking was resumed. In December the second level was reached at a depth of 250 ft. This level has been opened out for a distance of 35 ft. North of the shaft, and on the 29th of the month sinking was resumed. On December 31st the shaft was bottomed at a depth of 260 ft. The shaft will be 400 ft. in depth, and there remains only one level to be opened out at a depth of 350 ft., the final 50 ft. being necessary for skip

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pit and sump.

This shaft has been worked on two ten-hour shifts, as it has been comparatively dry. Since October there has been some water coming into the shaft, but in such small quantities that it could be bailed out in the bucket without seriously interfering with the work. The pipe has been ordered for the permanent discharge line; also two pumps have been received and will be installed as soon as the water increases.

The rock in the shaft is very hard soft ore jasper. It is full of slips which cause the drills to deviate, proving a serious hindrance to rapid drilling. The shaft is timbered for a distance of 240 ft. The cage road has been cased and the runners put in to the bottom set of timber; also the permanent ladders and sollers have been put in.

Steam was used for hoisting and drilling until the middle of May when the electric compressor went into operation. Since this time air has been supplied for the hoist and the drill machines at a pressure of seventy five lbs. and much better results have been obtained.

#### 1st LEVEL DRIFT.

In November drifting was started on the first level, the broken rock from the drift being hoisted while drilling was done in the shaft. Drifting was continued throughout November, no work being done during December as the miners worked with the shaftmen cutting out the second level plat. The drift is now in 80 ft. North of the shaft, and is 120 ft. distant from the ore body. It is expected that considerable water will be encountered when the ore body is reached, and for this reason the drift must be watched closely until the pumping plant is installed. The drift is still in a hard soft ore jasper, and thus far has been comparatively dry. After the pumping plant is in commission, this drift will be pushed until the ore body is reached, after which the men will be transferred to the second level to drift into the ore.

It is planned to finish sinking the shaft before attempting to

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hoist any ore. By the time sinking is completed and the third level plat cut, it is expected that the electric hoist will be in commission and the trestles erected so that mining operations can be started.

#### MINE BUILDINGS.

In January a contract was given for the Engine House and office, and construction was started at once on these buildings. They were completed in March. The foundation for the compressor was installed some time before it arrived and all preparations completed for putting it in commission quickly. The compressor arrived in April and went into commission on May 16th, it being somewhat delayed by the transmission line from North Lake. In April a contract was given for the erection of a dry, barn and a combined blacksmith and carpenter shop. All of these buildings were completed by the last of June and were occupied at once. In September a contract was let for the erection of a building for Heating Plant. This building is of brick and concrete construction and was completed on the last of November. All of the buildings with the exception of the Heating Plant are of frame construction, concrete being used for floors wherever possible. The frame buildings have been given two coats of white wash made according to the U. S. Government's standard.

The mine office contains two rooms for office force, a pay corridor and a large warehouse room. The warehouse floor is of concrete, the office part having hardwood floors. The building is heated with live steam from the Heating Plant, and is electric lighted. Owing to the small amount of clerical work necessary at this mine, no regular clerk has been employed here, the work being handled directly from the North Lake office.

The dry is a frame building with concrete floor, eighty steel lockers, steel wash troughs, two shower baths and a small private change room for the underground bosses. This building is steam heated, has hot and cold water and is electric lighted.

The Engine House was designed to house an electric driven compressor and an electric hoist. The compressor has been installed in the rear of the

BARNES MINE.

building, the front being left vacant for the hoist, which it is expected will be in commission by June 1st, 1911. The temporary hoist is located directly in front of this building, being inclosed by a temporary frame structure.

The barn is located at the east side of the clearing made for the mine, and will accommodate three horses. The rear of the barn is used as a hitching shed for horses, it being inclosed on three sides.

The Blacksmith shop has been equipped with one forge, a drill sharpener and a drill sharpener furnace. One blacksmith and a helper are employed, and it requires practically all of their time to keep the drills sharpened. The number of drills sharpened per day varies from one hundred to two hundred twenty five, depending on the nature of the ground. This building is electric lighted and the Carpenter Shop is steam heated.

#### BARNES SHAFT HOUSE.

The steel shaft house was erected in June and part of the carpenter work completed. The top landing floor has been put in, also the wooden lining of the pocket and of the skip dumps.

#### TRESTLES AND STOCKPILE GROUNDS.

The material for the trestles has been received, and both the ore and rock trestles will be erected in the spring. A gravity tram system will be used at this mine on both the ore and rock trestles; a puffer will be used to pull the cars back to the shaft. The ore stocking grounds was cleared of trees and stumps in the spring, and the ground has been leveled and graded for a distance of 200 ft. The ground was very uneven and considerable work was necessary to get it in condition for laying the stockpile plank.

#### GENERAL SURFACE.

The ground South of the shaft house was several feet lower than the ground at the shaft and also at the buildings. The broken rock from the mine was used to fill this ground, and in this way it was possible to level the greater portion of it before the winter set in. Owing to the small fill here,

BARNES MINE.

it was impossible to carry on the work after the snow fell, and the rock dump was changed to the North of the shaft, the rock being dumped on the ore body. The waste from the grading done for the railroad lines has been dumped here, and when this ground is leveled off, all of the low ground will have been filled.

Roads have been constructed from the public highway leading into the mine and connected with the various buildings. Some grading was done around the mine buildings, but it was impossible to complete the work this year.

In order to handle the water which will come from the mine it was necessary to construct a wooden launder about 300 ft. in length. This launder will discharge the water into a valley some 500 ft. South and East of the ore body. The water will be carried from the collar of the shaft to the mouth of the launder, a distance of 150 ft. in an iron pipe, this being a continuation of the discharge pipe from the shaft.

#### BARNES TRANSMISSION LINE.

A survey was made for a pole transmission line from North Lake to the Barnes Mine in February, and a clearing fifty feet in width was made between these two properties, a distance of two and one half miles. A pole line carrying six wires was then constructed and current was available early in May.

#### LOCATION.

A contract had been let in 1909 for the construction of a Boarding House, five double houses and a captain's house. These buildings were completed in the spring, and a number of them are now occupied. Four drive wells were put down to provide water for these houses and an abundant supply of excellent water has been obtained. Fences of the same type as at the North Lake location have been built here. Roads have been constructed and graded, and the location now presents a neat and attractive appearance.

#### WATER SUPPLY.

A 15,000 gallon tank was erected about 50 ft. East of the Engine House, on a small hill, the floor of this tank being twenty feet above the surface of the ground. A diamond drill pump station was being operated near

#### BARNES MINE.

the mine, the water being obtained from an old abandoned shaft. Connections were made to their pipe line and water for the mine was obtained from this source until in the fall. There is a ravine about forty feet below the general surface level directly behind the Engine House, and it was decided to sink a well here to test the water supply. The water level was struck at a depth of 17 ft., and the test showed that there was sufficient water available for the mine. The well was sunk four feet deeper into the water bearing gravel, and a No. 3 Knowles pump installed 16 ft. below the surface. A line to the tank was put in and the tank is kept filled by pumping about three hours out of every twenty four. The water is used for the air cooler at the compressor, for the boiler of the Heating Plant, for hot and cold water system in the dry and for the Blacksmith Shop.

#### FATAL ACCIDENTS.

A fatal accident occurred at the Barnes Mine on November 10th, in which one miner received injuries which caused his death twenty four hours later. It was caused by the cross-head hanging in the shaft, the man receiving his injuries when the cross-head fell to the bottom where he was working. The cross-head in use here was a new one, and the evidence points to the fact that it stuck above the collar where some runners had been put in on the previous day.

ASHLAND MINE.

GENERAL SURFACE.

No new work has been undertaken on surface during the year and only the regular work of caring for our product as hoisted, stocked and shipped; framing of mine timber, and shop work has been underway.

Everything around surface is being taken care of in the best way possible and our surface force has been reduced as much as possible.

The caved area has deepened during the year but the limits of the "break off" has not extended to any extent.

Cement walks have been laid on both sides of the main street leading to the mine. This expense was borne by the mine and City in equal proportions.

BUILDINGS.

Few repairs have been found necessary to our mine buildings during the year and though old, they are all in fair condition.

Our old office building and one of our dwellings remain empty at this writing. Very few repairs have been necessary on our dwelling houses during the year.

ASHLAND MINE.

SURFACE.

DOCKS, TRESTLES AND POCKETS.

During the past summer Coal Dock No. 2 was overhauled, the corbals renewed and the old hemlock stringers replaced with 14" X 14" Fir timber. This places both Coal Docks in good condition and very little expense should be necessary in maintaining them for several years to come.

The stringers on our permanent trestle to No. 9 stocking grounds were also renewed and covered with new 3" Tamarack plank.

Two bents were added to our Rock Trestle running from No. 9 Shaft out into the caved area. This gives us adequate capacity for rock to be hoisted during the coming winter.

During the summer we rebuilt ~~this~~ Rock Trestle nearly its entire length by renewing the caps and stringers which had been in place since 1902 and were badly decayed.

SHAFT HOUSES.

Our No. 3 Shaft house and Pocket, being built of wood, is in poor condition and considerable repairs have been necessary during the past year. We plan on endeavoring to make this hold out until the ore in this part of the mine is exhausted and figure we can do so unless new finds prolong the term of activities at the West end of the mine

ASHLAND MINE.

ASHLAND MINE.

SURFACE.

SHAFT HOUSES.

Our Steel Shaft House at No. 9 Shaft is in excellent condition and no expense has been incurred in maintaining same during the year.

SHIEVES.

During the year a new 10' Angle Shieve and a new top Shieve were placed to carry the Cage rope at No. 9 Shaft. The old ones had become badly worn and had to be replaced to warrant the safe handling of our men.

A concrete base was also built underneath the new Angle Shieve installed to replace the old wood base which was badly decayed

SKIPS AND CAGES.

During the year we have practically rebuilt the three four-ton Skips in use in No. 9 Shaft. These old Skips were placed in work July 1st, 1902 and have given good service.

We have also built a new Cage for use in No. 9 Shaft to replace the old one which has been in use for eight years and is beginning to show signs of wear.

All of this work has been done in our own shops by our regular force.

ASHLAND MINE.



ASHLAND MINE.

SURFACE.

TRACKS AND YARDS.

Nothing new has been attempted here during the year.

Our Yards and Tracks are very conveniently arranged for the economic handling of our work and very little expense is necessary for maintenance.

HOISTING MACHINERY.

Our Hoisting Machinery, though old, and heavily over worked, continues to give us good service and we have been under practically no expense for their up-keep except the regular charges for renewing worn out Brake and Friction Bands.

These engines are exceptionally heavy users of steam which accounts in a measure, for our heavy fuel consumption.

AIR COMPRESSOR.

This machine is the hardest worked of any of our equipment and has given us good service with small expense for maintenance during the year.

ASHLAND MINE.

SURFACE.

BOILERS.

With the two new Boilers installed last year requirements have been ample during the year. Our plant has proved equal to the service required.

HAULAGE ENGINES.

Our Top Tram Haulage Engine at No. 9 Shaft has caused us some trouble during the year account the breaking of the main shaft in January and again in December. The fault lay in the construction of the shaft and as this has been corrected no further difficulty is expected.

The Top Tram Engine at No. 3 Shaft continues to give excellent service and no repairs have been necessary.

BENEFIT CLUB.

We continue this item the same as last year and find it works out entirely satisfactory both to our workmen and our Company.

During the year we have paid out in benefits to the men the sum of \$846.70 account accidents during the past twelve months.

A balance of \$3,710.11 remains in this fund as of December 31st, 1910.

ASHLAND MINE.

SURFACE.

HOME GARDENING PRIZES.

We have continued the practice of awarding prizes for Best Kept Premises, Flower and Vegetable Gardens and are pleased to be able to report that our tenants take great interest in the matter as is proven by the greatly improved appearance of our mine locations.

Our Townpeople are pleased with this matter and our Company has been commended on the spirit shown in undertaking a work of this nature.

PERSONAL INJURIES.

We are pleased to be able to report that no fatal or serious accidents have occurred during the year.

We have had the usual number of minor injuries but none of much consequence.

We are thankful for this condition of affairs, for with the character of the ground we are now working-in the old caved area, and the difficulties under which our operations are prosecuted we consider ourselves very fortunate.

ASHLAND MINE.

SURFACE.

MINE TIMBER AND LAGGING.

We continue to purchase our requirements of timber and lagging from local farmers and jobbers at exceptionally reasonable prices.

Our purchases for the coming year are the lowest in our history.

SORTING ORE.

All our ores are sorted and hand picked from the time they are broken in the stopes until they are on their way to the furnace. This proves very expensive but must be done in order to make our ores anywhere near merchantable.

ACCIDENTS TO EQUIPMENT.

Although most of our equipment is old and crowded with work we have had very few accidents or delays during the year and great credit is due to our Mechanical department for the manner in which care is taken of all our machinery.

ASHLAND MINE.

ASHLAND MINE.

SURFACE.

SHIPMENTS.

Our shipments were placed underway at an early date this year and an early "clean up" this fall was the result.

We commenced shipments from shafts to the Docks on April 1st, and the last boat cleared on November 23rd. Shipments from the mine, with the exception of a few hundred tons to complete final cargo, were concluded on November 2nd,

Shipments were handled with very little trouble during the season and good service was rendered by the Railways.

We have continued our practice of holding large balances in Docks and Cars for mixing purposes. This does not meet with the full consent of our Railway friends but we find it absolutely necessary in order to get our cargoes properly mixed.

Shipments over each road is shown by months in the following statement:-

SHIPMENTS-ASHLAND MINE-1910.

	300 LINE RY.						CHICAGO & NORTH WESTERN RY.						GRAND TOTAL	
	DOCKS		ALL RAIL		TOTAL		DOCKS		ALL RAIL		TOTAL			
	TONS	LBS	TONS	LBS	TONS	LBS	TONS	LBS	TONS	LBS	TONS	LBS	TONS	LBS
January														
February														
March														
April	10923	0980			10923	0980	11581	2160			11581	2160	22505	0900
May	20576	0160			20576	0160	19290	2100			19290	2100	39867	0020
June	18449	2040			18449	2040	11663	1380			11663	1380	30113	1180
July	23515	0900			23515	0900	20315	1800			20315	1800	43831	0460
August	13535	0300			13535	0300	23718	0280			23718	0280	37253	0580
September	6154	1340			6154	1340	24523	0680			24523	0680	30677	2020
October	11876	1460			11876	1460	10135	1200			10135	1200	22012	0420
November	4312	0320			4312	0320	933	1280			933	1280	5245	1600
December														
TOTAL	109343	0780			109343	0780	122162	1920			122162	1920	231506	0460
1909	158125	0900			158125	0900	101486	1660			101486	1660	256912	0320
1908	133646	1260			133646	1260	125694	0940			125694	0940	259340	2200
1907	146739	1640			146739	1640	151314	1860			151314	1860	298054	1260
1906	192350	0500	285	1538	192635	2038	149204	2040			149204	2040	341840	1838

ASHLAND MINE.

ASHLAND MINE.

SURFACE.

SHIPMENTS.

The Soc Line fell behind this year on the total although we endeavor to give each road an equal tonnage. They were unable to handle the ore at different times during the season, consequently the Northwestern's tonnage was increased.

MIXING OF ORES.

The properly grading and mixing of our ores problem grows more serious every year and we continue our work of past years of giving every cargo a "cocktail" mixture of from four to eight kinds of material. The success of our methods is evidenced by the results received on the ores as determined by Lower Lake Chemists as per comparative statements herewith.

We are getting a little clean ore from the mine on our 17th, level which is being used as "sweetening" with the material coming from the old caves.

We continue to ship six and sometimes eight grades of ore to the Docks and mix these out into our regular Ashland and Globe grades.

The following statement shows the mine analysis on ores forwarded to Dock each month and the average for the season together with the Lower Lake Chemists averages for comparison.

ASHLAND MINE.

ASHLAND MINE.

SURFACE.

LABOR.

We have had no difficulty in securing necessary labor during the past year and no labor troubles of any kind have been experienced.

Our organization continues to give excellent service and the loyal and conscientious performance of their several duties is recognized and appreciated.

Wages were increased an average of about 7% taking effect April 1st, 1910, which, of course, proved most acceptable to the men.

STOCKPILE BALANCES.

We have in stockpile as of December 31st, 1910 the following tonnages:-

	ASHLAND ORE	GLOBE ORE	HIGH PHOS ORE	TOTAL
No. 3 Shaft	8,023	2,928		10,951
No. 9 Shaft	<u>17,153</u>	<u>1,158</u>	<u>3,541</u>	<u>21,852</u>
TOTAL	25,176	4,086	3,541	32,803

ESTIMATE OF PRODUCTION.

Our estimate of production for the year 1911 is as follows:-

ASHLAND ORE	120,000 tons
GLOBE ORE	<u>45,000 tons</u>
TOTAL	165,000 tons

ASHLAND MINE.

ASHLAND MINE.

SURFACE.

ESTIMATE OF PRODUCTION.

We cannot estimate with any degree of accuracy just what our production will be and hope to exceed the above figures and will do so if possible.

The following statement gives the result of our development work during the current and previous years,-

	1902	1903	1904	1905	1906	1907	1908	1909	1910
In sight Dec. 1st,	700000	1056000	844000	861000	957500	673500	356990	261100	226900
Product-Fiscal Year	309701	375012	266233	346694	338306	305901	277233	274046	216197
Balance	390299	680988	577767	514306	619190	367599	79757	12946	10703
In sight Dec. 31st,	1056000	844000	861000	957500	673500	356990	261100	226900	197000
Developed Fiscal year	655701	153012	283233	443194	54306	110609	181343	239846	186297

ASHLAND MINE.



ASHLAND MINE.

UNDERGROUND.

NO. 3 SHAFT.

SEVENTH LEVEL.

Two and three gangs have been kept at work on the East end of this level all through the year. A fair product has been won but of low grade which, by careful mixing, has all been worked in with the product from the rest of the mine.

It is quite impossible to make any prediction as to the amount of ore that can be mined from this territory during the coming year. Workings are in old caved ground and may become exhausted at any time.

During the year just closed we mined a total of 12,695 tons from here which is much more than could have been expected at the beginning of the year.

TENTH LEVEL.

Work on this elevation both East and West of the shaft has continued all through the year and an excellent product has been secured. The ore on the foot-wall West of the shaft was followed up a distance of over 100 feet above the level, the width was only 10 to 16 feet and the ground was "boney" but with careful sorting a merchantable product was secured. Very little known tonnage remains West of the shaft.

East of the shaft we have had several gangs at work in the old rooms and they have worked right up to the elevation of the old 8th, level. In order to provide ready and safe access to this territory the footwall drift from No. 9 shaft was extended to connect with these

ASHLAND MINE.

ASHLAND MINE.

SURFACE.

NO. #3 SHAFT.

TENTH LEVEL.

old workings. This connection was made the second week in December.

We look for four to six thousand tons of ore at this point.

A total of 20,304 tons ore have been mined from this level during the year.

TWELFTH LEVEL.

Operations were resumed on this elevation in February month and have continued the balance of the year.

We have extended our workings up to the bottom of the large dike underneath the 10th, level and are now stoping out the ore. An excellent product is being secured from this territory and during the year a total of 8,200 tons have been won.

THIRTEENTH LEVEL.

This was a new level opened late in 1909 and during the year just closed has produced a total of about 6,000 tons ore of excellent quality. The ground has been opened clear through to the 12th, level.

No work is being done here just at this writing as the work of removing the ore on the 12th, level and above will be completed prior to opening too much ground at this lower elevation.

ASHLAND MINE.

ASHLAND MINE.

UNDERGROUND.

NO. 3 SHAFT.

FOURTEENTH LEVEL.

Little work has been done here during the year. A raise has been put up and holed through to the 13th, level West of the shaft. The ground is very "boney" but is being mixed in with the daily product.

GENERAL.

During the year just closed, the West end of the mine (No. 3 Shaft) has produced a total of 52,034 tons. This has all been somewhat high in phosphorus but the largest percentage has been shipped out as Bessemer grade.

We look forward to fair returns from here during the coming year.

ASHLAND MINE.

UNDERGROUND.

NO. 9 SHAFT.

SIX AND ONE HALF LEVEL.

We have nothing new to report from the old scrams in this territory. They have produced better than we expected and we can see a number of months work ahead of us in this old caved area.

At times the ore coming from here has been of exceptionally poor quality but all has been mixed out as mined.

During the year a total of 44,716 tons was mined from here. This amount is less than one half of the tonnage secured from this territory last year and it can, therefore, be readily seen how this part of the mine is becoming rapidly exhausted.

SEVENTH LEVEL.

Work on this elevation has been crowded all the year and a total of 38,581 tons have been secured.

One contract (No. 10) completed the scrambling of the balance of the ore remaining in the old No. 6 Shaft pillar North of the shaft.

The territory near old No. 5 Shaft has given us a large quantity of high grade ore during the whole year and this has been used as "sweetening" for the tonnage coming from the old caves. Only two gangs are at work at this point and very little ore remains.

Several gangs have been scrambling and caving on the main level, both East and West of the shaft and have secured reasonable returns.

ASHLAND MINE.

ASHLAND MINE.

UNDERGROUND.

NO. 9 SHAFT.

SEVENTH LEVEL.

The main level East was reopened and repaired clear through to our East line and we are now securing a good product from the old caves in this territory.

One contract also drove a new drift North East to our line and have taken considerable ore during the last six months. They are now caving back and taking what ore remains.

The large room on the East end of this level which was being filled, caved and settled to such an extent, that nothing could be done there during the year. We must now wait until all the ore at a higher elevation has been taken and this room completely filled before we can operate at this point.

EIGHTH LEVEL.

Five and six gangs have been at work between the 7th, and 8th levels all the year and a fair product has been secured.

The work of maintaining the openings in this territory is very expensive.

West of the shaft a raise has been pushed through to the 7th, level. This will be used later when we commence to take the ore at this point.

The drift West along the footwall on this level has been extended to the large rooms near No. 4 shaft and will be used by the men in going to and from this territory, as well as providing a tram way for tools, timber, etc. Most of the ore from this territory

**ASHLAND MINE**

ASHLAND MINE.

UNDERGROUND.

NO. 9 SHAFT.

EIGHTH LEVEL.

will be taken through No. 3 shaft, on account of the shorter tram and convenience of handling.

A total of 19,021 tons ore were secured from this level during the last twelve months.

EIGHT AND ONE HALF LEVEL

Work on this elevation was commenced in April month. Old No. 6 shaft was cleaned out and cribbed up to be used as a chute to carry the ore to the 10th, level.

One contract is taking ore off the large dike North.

NINTH LEVEL.

Old No. 7 Shaft has been repaired from the 10th to the 9th, level.

One contract raised through to the 8th, level in ore. The ground here looks as though it would make considerable ore and we look for a good product from here during the coming months.

ASHLAND MINE.

ASHLAND MINE.

UNDERGROUND.

NO. 9 SHAFT.

TENTH LEVEL.

Exploratory work was put underway on this level in May month and some ore has been mined.

West of the shaft a raise was put through to the 8th, level, this encountered a little ore and a sub has been opened out. The ground is lean and "boney" and does not look encouraging.

ELEVENTH LEVEL.

One contract continued at work on this elevation to June month at which time the ore became exhausted and nothing is now being done here.

A total of 3,561 tons were secured from here during the year.

THIRTEENTH LEVEL.

The work of taking the ore lying on the footwall West of the shaft was completed during October month. We secured a good product from here and during the year 8,267 tons were mined.

The drift West along the Fault Zone was pushed through to the 1800' meridian as recommended by Mr. Smyth and as nothing encouraging was found it was discontinued.

ASHLAND MINE.

ASHLAND MINE.

UNDERGROUND.

NO. 9 SHAFT.

FIFTEENTH LEVEL.

The balance of the ore lying on the large dike between the 15th, and 16th, levels has been mined during the year and no ore is now being secured from this level.

During the year the drift West of No. 3 shaft, along the Fault Zone has been pushed through to the 2550' meridian. No ore has been encountered but the drift is now in a large dike and may show something further ahead.

This drift was also driven East in the Fault Zone, from line of No. 3 shaft a distance of 250 feet without results.

SEVENTEENTH LEVEL.

The ore encountered on the East end of this level has been mined out with the exception of the pillars left for temporary support.

The drift West along the footwall has been pushed through to our West line. About 200 feet from our line this drift entered a mixed formation- ore and jasper- and we have opened this up with raised to a point 80 feet above the level. The ore is low in iron and badly mixed with rock and every pound must be hand picked.



ASHLAND MINE.

UNDERGROUND.

NO. 9 SHAFT.

SEVENTEENTH LEVEL.

Very little ore was secured at the 2100 foot meridian as reported found last year. There was a thin band of lean ore lying right on the footwall which proved of little value.

The drift West along the Fault Zone has been driven to the 2400 ' meridian and short crosscuts driven North at 100' intervals but we are unable to report anything encouraging from this work.

WINZE.

The ore lying on the large dike on the East end of the 17th, level was found to continue downward, therefore an inclined winze was sunk back in the dike and two levels have been opened out in the ore. Mining of ore was commenced here in August month and since that time a total of 5,981 tons have been taken from here.

The ore is opening out much larger than above the level and we look for a large product from here during the coming twelve months. Most of the ore is very high in phosphorus- some of it running as high as 1 3/4%

ASHLAND MINE.

ASHLAND MINE.

UNDERGROUND.

NO. 9 SHAFT.

EIGHTEENTH LEVEL.

Part of the ore between the 17th, and 18th, levels has been mined during the year, but a small amount still remains to protect the levels. This can be taken at any time.

The opening made by the removal of this ore has been used to dump rock coming from our operations on the 17th, level. This eliminates the hoisting of the material and is quite a saving in the cost of handling.

SHAFT SINKING.

During January of this year, the pentice was removed in No. 9 shaft and the balance of the timbering and rail for skips placed which completed the shaft to the depth of 1,539 feet vertical.

In October, the work of sinking No. 9 shaft an additional lift of 250 feet was authorized and the work is now underway.

Owing to the condition of the shaft above it was deemed advisable to place a bulkhead in the shaft at the 18th level in order to insure the safety of the men, should anything fall down the shaft. This has been done and the work of sinking will be pushed as rapidly as possible from now on.

ASHLAND MINE.

ASHLAND MINE.

UNDERGROUND.

NO. 9 SHAFT.

SHAFT SINKING.

The shaft is now below the pentice; the first set of "bearers" have been placed. Shaft Timber is on hand and no delays are looked for in the completion of this work.

This shaft has now reached a depth of about 50 feet below Sea Level.

DIAMOND DRILLING.

In March month a station was cut back in the footwall and preparations made to put a Drill Hole down to explore the ground below the 17th, level for dikes.

Drilling was commenced on April 23rd, and the work discontinued on September 24th. A total depth of 665 feet was reached at which point the rods became disconnected and could not be recovered. The work and bit have been abandoned but the latter will be recovered by mining operations at a later date.

This hole was started back in the footwall but at a depth of 227 feet it passed into the ore formation and cut a 23 foot dike at 286' to 309' and from here to depth of 553' it was in Jasper; at this point some lean ore was encountered; at a depth of 572' to 614' a good grade of ore seems to show up, the sample taken from the sludge running 59.71 Iron, 082 Phosphorus. At 614' the hole entered an 18' dike and after passing this was bottomed in Jasper.

ASHLAND MINE.

ASHLAND MINE.

UNDERGROUND.

DIAMOND DRILLING.

No. 9 shaft is now being sunk to an elevation which will permit us to run a drift to develop the ore encountered in this Drill hole.

REPAIRING NO. 9 SHAFT TIMBERING.

On account of the rapid decaying of the timbers in our No. 9 shaft, we have been unable to keep up with our repairs on Sundays and Holidays; we therefore discontinued hoisting rock on the night shift in June month and placed a repair gang on this work at night. We continue this work and hope to keep the shaft in proper shape so as not to interfere with our operations until the repairs are completed.

SILICIOUS ORES.

We have continued to mix in all of the material coming from our old caves and have not been compelled to make an ore of low grade during the past year. There have been times, however, when some of our contracts have been running little better than 40% in Iron, but by careful sorting and mixing everything has gone into the product of our regular grades.

ASHLAND MINE.

ASHLAND MINE.

UNDERGROUND.

ROCK DRIFTING AND EXPLORING.

Our rock drifting for Exploratory purposes have gone forward on the day and night shift all the year, but we are sorry we are unable to report any finds of ore. The work is being continued on the 10th, 15th, and 17th, levels in both the Footwall and Fault Zone.

NUMBER FEET ROCK DRIFTING—MONTHLY AND FOR THE YEAR 1910.

MONTH	ASHLAND MINE.	FEET
January		565
February		669
March		638
April		644
May		535
June		476
July		512
August		532
September		372
October		416
November		360
December		257
TOTAL		5996
Feet per Man		27.63
1909		26.22
1908		22.5
1907		16.3
1906		17.6
1905		18.7
1904		19.6
1903		11.6
1902		13.6

Feet Per Man based on Total men employed at Mine.

From the above statement it will be seen that our rock drifting during the year per man employed is the heaviest of any year since our Company have operated the mine. The cost of this work was \$24,816.47 and figures a cost of 11½ cents per ton on ore produced. This accounts, in a measure, for our increasing costs of production.

ASHLAND MINE.

ASHLAND MINE.

UNDERGROUND.

WATER COLUMN.

We have had some trouble during the past month by a breakage in our Water Column, above the 16th, level in No. 9 shaft and one day was lost in our hoisting on account thereof. Repairs are now made and we hope for no further trouble.

PUMP.

All our mine pumps have given us good service during the year and we have been under very small expense except for regular attendance.

ESTIMATE OF ORE IN SIGHT.

Following is an estimate of the ore insight as of December 31st, 1910:-

On and above the 7th, level	50,000 tons
Between 7th, and 8th, levels, No. 9 Shaft	30,000 "
Between 8th, and 10th, levels, East of No. 9 shaft	5,000 "
Between 8th, and 9th, levels No. 6 & 7 Sh.	8,000 "
17th, level, Winze Territory	52,000 "
17th, level and above, near West Line	7,000 "
Between 10th, and 14th, levels-No. 3 & 4 Sh.	45,000 "
TOTAL	197,000 "

RECORD

ASHLAND MINE.

UNDERGROUND.

GENERAL.

Our conditions underground continue to depreciate and notwithstanding our large amount of exploratory work, we are unable to report any large finds of new ore. We have a nice bunch of clean ore in the Winze, on the East end of the 17th, level, and a small tonnage of low grade ore on the West end of the 17th, level; outside of these two places, with the additional ore on the 12th, and 13th, levels, No.3 shaft, we have nothing of any importance to look forward to excepting the ore as shown in the drill hole below the 17th, level. What this will amount to cannot be ascertained until our workings have been pushed into the territory and the ground developed; this cannot be accomplished during the next year.

It will be noted from reports that we are now working 27 men less underground than at this time last year. This is due, simply, to the fact, that when certain contracts exhaust the ore in their place we have no new territory, to which to transfer the men and they must be laid off.

During the year we drifted in rock a total of 5,996 feet at a cost of \$4.14 per foot. This is an average of 27.63 feet for every man employed at the mine, both underground and on surface and is the greatest for any year in the history of the mine.

During the year we hoisted a total of 26,609 tons rock and dumped and stored in old workings underground thousands of tons additional.

ASHLAND MINE.

ASHLAND MINE.

UNDERGROUND.

GENERAL.

Our product during the year was 216,197 tons, hoisted on 302 working days, with an average hoist of 724 tons per day.

An average of 3.31 tons per man per day has been maintained during the year. This gives us a total of 1,000 tons product per man for the year, which, under the condition of our ore bodies can be appreciated. I believe this product is not equalled by any other mine on the Gogebic Range.

The repairs to our shaft timbering must be carried on during the succeeding months, this, together with the heavy expense of maintaining our openings in the caved territory and our large amount of rock drifting will keep our costs at a high point during the coming year.



ASHLAND MINE.

SHIPMENTS FOR 1910.

	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Ashland	107,270	83,015	190,285	193,686
Globe	20,047	21,175	41,222	65,926
Total	127,317	104,190	231,507	259,612
Total last year	119,547	140,065	259,612	
Decrease - 11%			28,105	

ORE STATEMENT FOR DECEMBER 31, '10.

	ASHLAND	GLOBE	TOTAL	TOTAL LAST YEAR
On hand Jan. 1, '10	34,075	12,609	46,684	29,271
Output for year	179,916	36,281	216,197	274,046
Stockpile overrun applying on previous years	2,374		2,374	2,979
Total	216,365	48,890	265,255	306,296
Shipments	190,285	41,222	231,507	259,612
Balance on hand	26,080	7,668	33,748	46,684
Decrease in output corresponding (12 mos. - 16%)			40,477	
Decrease in ore on hand			12,936	

AVERAGE MINE ANALYSIS OF OUTPUT.

GRADE	IRON	PHOS.
Ashland	57.91	.052
Globe	57.44	.090
High Phos. Globe	58.24	.469

AVERAGE MINE ANALYSIS ON STRAIGHT CARGOES.

GRADE	IRON	PHOS.
Ashland	57.76	.052
Globe	57.13	.098

ASHLAND MINE.

SURFACE.

MIXING OF ORES.

ASHLAND ORE  
MINE ANALYSIS-SHIPMENTS TO DOCKS.

MONTH	SOO LINE DOCK			C & N.W. RY DOCK			TOTAL		
	CARS	IRON	PHOS	CARS	IRON	PHOS	CARS	IRON	PHOS
April	392	57.26	.051	330	57.48	.052	722	57.40	.052
May	1030	58.12	.051	270	57.62	.050	1300	57.95	.050
June	413	58.20	.051	235	57.89	.054	648	58.04	.053
July	779	57.21	.054	342	57.68	.051	1121	57.43	.053
August	277	57.18	.050	543	57.87	.054	820	57.70	.053
September	150	57.56	.052	431	57.35	.050	581	57.40	.051
October	317	57.69	.054	147	58.52	.053	464	57.99	.054
November	50	58.50	.048				50	58.50	.048
TOTAL	3408	57.67	.052	2298	57.70	.052	5706	57.70	.052

GLOBE ORE.  
MINE ANALYSIS-SHIPMENTS TO DOCKS.

MONTH	SOO LINE DOCKS			C & N.W. RY DOCK			TOTAL		
	CARS	IRON	PHOS	CARS	IRON	PHOS	CARS	IRON	PHOS
April	102	56.20	.065	31	57.90	.069	133	56.81	.066
May	170	56.33	.100	55	55.66	.098	225	56.06	.099
June	261	57.16	.116	33	57.57	.065	294	57.25	.106
July	443	56.85	.109	76	58.03	.072	519	57.16	.099
August	7	57.01	.073	24	57.64	.076	31	57.52	.074
September	52	58.05	.115	97	57.91	.139	149	57.95	.132
October	84	59.18	.208	34	59.15	.168	118	59.17	.199
November	1	64.80	.145				1	64.80	.145
TOTAL	1120	57.08	.114	350	57.65	.106	1470	57.30	.111

ASHLAND MINE.

ASHLAND MINE.

TIMBER STATEMENT FOR YEAR ENDING DECEMBER 31, '10.

KIND	LINEAL FEET	AVG. PRICE PER FOOT.	12 mos. 1 9 1 0 AMOUNT	13 mos. 1 9 0 9 AMOUNT
Cribbing	25,910	.01424	369.00	766.00
6" to 8" timber	51,894	.03755	1948.68	3956.40
16" " 18" "				124.50
18" " 24" "	744	.08871	66.00	
Total	78,548		2383.68	
Total 1909	163,469	.02960		4846.90

	LINEAL FEET	AVG. PRICE PER 100'	1 9 1 0 AMOUNT	1 9 0 9 AMOUNT
7 ft. lagging	221,025	.381	842.00	1896.00
8 ft. lagging	26,400	.625	165.00	290.00
Poles	9,832	2.07	203.60	644.60
Total	257,257		1210.60	
Total 1909	575,413	.491		2830.60

	1 9 1 0	1 9 0 9
Feet of timber per ton of ore	.363	.596
Feet of lagging per ton of ore	1.14	2.10
Feet of lagging per foot of timber	3.15	3.52
Cost per ton for timber, lagging and poles	.0166	.028
Equivalent of stull timber to board measure	167,211	291,188
Feet board measure per ton of ore	.773	1.06
Total Product	216,197	274,046
Total cost of timber and lagging, 1910 - 12 mos.		3594.28
Total cost of timber and lagging, 1909 - 13 mos.		7677.50
Total cost of timber and lagging, 1908 - 12 mos.		9679.27

ASHLAND MINE.

COMPARATIVE MINING COST FOR YEAR.

	12 mos. 1 9 1 0	13 mos. 1 9 0 9	INCREASE	DECREASE
<u>PRODUCT</u>	216,197	274,046		57,849
General Expense	.087	.073	.014	
Maintenance	.073	.080		.007
Mining Expense	.994	.945	.049	
<u>Cost of Production</u>	1.154	1.098	.056	
Exploratory	.040		.040	
<u>DEPRECIATION</u>				
Inventory	.001		.001	
New Construction	.010	.016		.006
<u>Total</u>	.011	.016		.005
Taxes	.057	.054	.003	
Central Office	.040	.040		
<u>Cost on Stockpile</u>	1.302	1.208	.094	
Loading and shipping	.021	.017	.004	
<u>Total cost on cars</u>	1.323	1.225	.098	
No. days operating	301	328		
No. shifts and hours	1-10 hr.	1-10 hr.		
Average daily product	718	836		
<u>COST OF PRODUCTION.</u>				
Labor	.775	.701	.074	
Supplies	.379	.397		.018
<u>Total</u>	1.154	1.098	.074	.018

ASHLAND MINE.

STATEMENT OF COMPARATIVE WAGES.

	12 mos. 1910	13 mos. 1909	INCREASE	DECREASE
<u>SURFACE</u>				
Total number of days	15,390 $\frac{1}{2}$	16,968		310 $\frac{1}{2}$
Average rate	2.45	2.35	.10	
Amount	37,692.43	39,876.98		2,184.55
<u>UNDERGROUND</u>				
Total number of days	50,005 $\frac{1}{2}$	59,083 $\frac{3}{4}$		5,425 $\frac{3}{4}$
Average rate	2.64	2.54	.10	
Amount	131,901.72	150,472.46		18,570.74
Total days	65,396	76,051 $\frac{3}{4}$		5,736 $\frac{1}{4}$
Average rate	2.59	2.50	.09	
Total Amount	169,594.15	190,349.44		20,755.29
Labor cost per ton	.784	.695	.089	

For comparison of days for twelve months, December, 1909, is omitted.

PRODUCT '10 - 216,197 tons PRODUCT '09 - 274,046 "	SURFACE		UNDERGROUND		T O T A L	
	1910	13 mos. 1909	1910	13 mos. 1909	1910	13 mos. 1909
Avg. no. men working	51	52	166	183	217	235
Avg. wages per day	2.45	2.35	2.64	2.54	2.59	2.50
Avg. wages per mo. 25 days	61.25	58.75	66.00	63.50	64.75	62.50
Avg. product per man per day	14.04	16.16	4.32	4.64	3.31	3.61
Labor cost per ton	.174	.146	.610	.549	.784	.695
Difference in labor cost per ton*	.028	*.020	*.061	-.016	*.089	*.005
Avg. product breakg & trammg			8.65	8.37		
Avg. wages for miners contract			2.77	2.59		
Avg. wages for trammers contract			2.33	2.22		
Total avg. wages for contract			2.75	2.56		

Avg. wages three months to March 31st, - \$2.50) Average wages for year \$2.59

Avg. wages for nine months to Dec. 31st,- 2.70) Increase in wages 8%.

Decrease in product per man per day - 8.3%.

- minus \* plus.

ASHLAND MINE.

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND	QUANTITY	AVERAGE PRICES	12 mos. 1 9 1 0 AMOUNT	13 mos. 1 9 0 9 AMOUNT
27% Powder	50	.808	4.04	648.42
40% "	200	.925	18.50	809.39
50% "	80,850	.1025	8284.56	9006.72
80% "	50	.1325	6.63	
Fuse	223,350	.378	844.26	999.22
Caps	65,000	.602	391.03	515.69
Total			9549.02	11979.44
Product			216,197	274,046
Pounds powder per ton of ore			.375	.379
Cost per ton for explosives			.044	.04370

IRON BELT MINE.

DISMANTLING MINE.

During January and February months the work of closing the Iron Belt mine and removing the Buildings and equipment belonging to our Company was completed.

All the cars, Rail, Pipes, Pumps etc., were removed from underground, and the Buildings, Trestles and Coal Docks erected on surface by our Company were taken down and all material and equipment shipped to the Ashland Mine and other mines of our Company.

STOCKPILE LOADING AND SHIPPING.

Shipments from the ore in stock at this mine were underway spread over the entire season and the following tonnages were forwarded:-

Iron Belt Bessemer	64,650 tons
Iron Belt Silica	<u>1,978 tons</u>
Total	66,628 tons

In the loading of this ore, the Steam Shovel and crew from the Ashland mine were used.

On account of the location and uneven character of the stock pile grounds and the numerous difficulties under which the loading was prosecuted the cost per ton for loading has been high as compared with some of our other mines.

BALANCE IN STOCKPILES.

We still have a balance of 3010 tons Iron Belt Silica ore in stock at this mine.

IRON BELT MINE.

IRON BELT MINE.

ORE STATEMENT AND SHIPMENTS FOR THE YEAR 1910.

	BESSEMER	SILICA	TOTAL	TOTAL LAST YEAR
On hand January 1st '10	68,497	4,988	73,485	49,064
Output for year	0	0	0	68,981
Stockpile Shortage	3,848		3,848	
Balance	64,649	4,988	69,637	118,045
Shipments	64,649	1,978	66,627	44,560
Balance on hand	0	3,010	3,010	73,485



ANNUAL REPORT, 1910

I beg to submit my report on the work done in the Swanzy District for the year ending December 31st, 1910.

I have taken up the various subjects under the following heads, viz:

General Remarks.

Austin Mine.

Stephenson Mine.

Princeton Mine.

Smith Mine.

Kidder Mine.

Northwestern Mine.

Section 35 Leases, ( D. M. & M.  
( C. & N. W.

Explorations.

General Surface.

Accidents.

GENERAL REMARKS

The principal work in the district has been that of the mines. The Stephenson and Princeton worked continually throughout the year, the former on two ten hour shifts, the latter on one ten hour shift. The Austin was shut down February 5th to August 1st, but since that time has been operating on two ten hour shifts. At the Smith shaft no mining was done. The product of the different mines for the year is as follows:

The Austin Mine product for the year was 69,500 tons, about 122,485 tons less than 1909.

The Stephenson Mine product was 237,752 tons, or 101,179 tons more than 1909.

The Princeton Mine product was 113,773 tons, or 20,878 tons less than 1909.

The total production for the district was 421,025 tons as against 463,209 tons in 1909.

At the Smith Mine the work was confined to driving cross-cuts to work the ore body on the 1st, 2nd, 3rd and 4th levels, sinking the rock shaft and cutting out plats and pockets on the 5th and 6th levels.

At the Kidder no work was done during the year.

At the Northwestern Section 27, The Foundation Company of New York finished the concrete shaft.

The work at the explorations was confined to stand piping for shaft site in the C. & N. W. Lease on the SE $\frac{1}{4}$  of the SE $\frac{1}{4}$  Section 35 - 45 - 25, and in the D. M. & M. Lease on the NE $\frac{1}{4}$  of the SE $\frac{1}{4}$  Section 35 - 45 - 25, and Diamond Drill Hole No. 53 in the NW $\frac{1}{4}$  of the NE $\frac{1}{4}$  Section 35 - 45 - 25, which was being drilled in the latter part of the year was finished in January.

At Gwinn Townsite the work was principally confined to grading and planting the Club House grounds, and road work on East side of the East Branch.

#### AUSTIN MINE

The production for December is as follows:-

Austin Bessemer,	9,972 tons,
Austin No. 2,	<u>1,948 tons.</u>
Total,	11,920 tons.

Production for the year 1910

Austin Bessemer,	55,580 tons,
Austin No. 2,	<u>13,920 tons.</u>
Total,	69,500 tons.

All the ore was shipped from the Bessemer stockpile and 64,481 tons from Austin No. 2 stockpile. The grades shipped from pocket were Bessemer 38,131 tons, Austin No. 2, 5,573 tons.

#### THE MINE

The work for the year has been principally confined to mining on 3rd and 4th levels and Sub. Levels above the 3rd, 4th and 5th levels.

The ore in sight December 31st was 491,854 net tons as against 544,587 tons shown a year ago.

#### SUBS ABOVE 3RD LEVEL

##### 210 FOOT SUB. LEVEL - EAST SIDE

The work for the year has been confined to removing pillars on East side of the Shaft pillar. This work was done by Contracts No's 7, 13, 8, 6, 15 and 19.

The following Contracts have been working on 210' Sub. Level during the month of December.

##### NO. 7 CONTRACT, M RAISE

No. 7 extended last months drift 8' and caved back to turn, then drifted Southeast along old hanging wall drift for 13' to old drift at V Raise.

##### NO. 13 CONTRACT, N RAISE

No. 13 drifted South from raise for 15' to old No. 6 workings and then caved back taking small pillar to right and left as it returned.

#### MAIN 3RD LEVEL - WEST SIDE

No work is being done on the West side of the 3rd level at the Present time. Contracts No's 9 and 10 stoped along hanging and foot on the West side of shaft pillar during August and September.

#### MAIN 3RD LEVEL - EAST SIDE

Three contracts have been working on the East side. No. 9 repaired the hanging wall drift to the East for 41', and then drove a drift parallel with and just North of the old drift for 125 feet. Contracts No's 14 and 6 have been removing ore along the hanging in the East end of the level.

The following Contracts have been working on the East side of the 3rd Level during the month of December.

NO. 8 CONTRACT

No. 8 extended last months drift on 210' Sub. Level W Raise 3' to old No. 15 and caved back taking ore on both sides also took out small pillar on North side of drift. It then went down on main 3rd level and drove stub drift 5' to Southwest from a point 10' Northwest of W Raise.

NO. 6 CONTRACT

No. 6 caved its drift back to main foot wall drift, it is now drifting Southwest from Z Raise.

NO. 14 CONTRACT

No. 14 in early part of month finished caving back its old drift. Then drifted Northeast from a point opposite Z Raise and holed into cross-cut at O Raise.

NO. 9 CONTRACT

No. 9 extended last months drift Southwest for 45'.

NO. 12 CONTRACT

No. 12 is repairing main level between M and N Raises.

SUBS. ABOVE 4TH LEVEL

250 FOOT SUB.

In the early part of the year Contracts No's 27, 17, 22, 4, 7 and 18 removed pillars on the West side of the mine. Only two contracts have been working on this Sub. Level since work was resumed in August.

The work for December was as follows:

NO. 23 CONTRACT, M RAISE

No. 23 is repairing drift near the top of its raise.

NO. 11 CONTRACT, M RAISE

No. 11, extended last months drift Southeast for 10' and Southwest 23'.

260 FOOT SUB. LEVEL

The work for the year consisted in driving hanging wall drifts on the East side from L to Q Raises by Contracts No's 28, 7, 4 and 22 and developing and mining on the West side by Contracts No's 10, 13, 5, 19, 3 21, 15 and 24.

The following work was done on the West side of 260' Sub. Level during the month of December.

NO. 3 CONTRACT, B RAISE

No. 3 in early part of month drifted Northwest on foot 15', then moved 171' North of its raise and drifted Northeast for 8' and Northwest for 13'.

NO. 15 CONTRACT, W RAISE

No. 15 extended last months drift to old workings and then caved back to within 35' of raise.

NO. 22 CONTRACT, W RAISE

No. 22 Contract started 22' from its raise and drifted Northwest for 28'.

NO. 5 CONTRACT, Z RAISE

No. 5 drifted Southwest toward foot for 30 feet, thence Northeast for 17' holing into No. 22 drift.

NO. 19 CONTRACT, Z RAISE

No. 19 Contract on hanging side of raise drifted Southwest 26', then starting 8' South of raise drifted Southeast 8'. Then starting 22' Northwest of raise drifted Northwest for 6'.

#### MAIN 4TH LEVEL

The principal work for the year consisted in driving a drift Southeast of and parallel with the old foot wall drift from a point 25' Southeast of C Raise to a point 60' Northeast of G Raise by No. 2 Contract, and mining in the Southwest end of the level, by Contracts No's 10, 13, 16, 14 and 1. Practically all the ore has been removed on the West side of the 4th level, South of F Raise.

The work for December was as follows:

##### NO. 10 CONTRACT,

No. 10 Contract is repairing main level drifts.

##### NO. 2 CONTRACT

No. 2 caved back old No. 4 drift to turn, then 4' from holing of No. 4 and No. 2 it drifted Northwest for 8'.

##### NO. 4 CONTRACT

No. 4 extended last months drift South for 17' to old workings and caved back, then drifted Southwest for 13' and holed in its old drift. It then caved back taking pillar to its right.

#### SUBS. ABOVE 5TH LEVEL

##### 295 FOOT SUB.

There was no work done on the 295' Sub. Level until September 1st. The work since the above date has consisted in mining and driving a few development drifts by Contracts No's 16, 17, 18, 20 and 21.

The work for December was as follows:

##### NO. 20 CONTRACT, A RAISE

No. 20 extended last months drift Southwest for 25'.

NO. 17 CONTRACT, B RAISE

No. 17 in early part of month repaired old drift. It then started 38' from cross-cut to N<sub>1</sub> Raise and drifted Northeast for 15'.

NO. 21 CONTRACT, B RAISE

No. 21 extended last months drift Southeast 13' and caved back 22' from turn.

NO. 16 CONTRACT, B RAISE

No. 16 caved last months drift and took another slice along old drift for 20' and caved back taking small pillar to right.

NO. 18 CONTRACT, C RAISE

No. 18 caved back old foot-wall drift to raise, then drifted Northwest for 8'.

AUSTIN UNDERGROUND IN GENERAL

The stockpile which was on the East side of the deposit was shipped last summer, and we are now mining the ore on the East side of the mine which we were not able to take out before on account of this stockpile.

The work at the present time is confined to the mining mentioned above and stoping ore on the Southeast end of the main 4th level and the sub. levels above the 4th level, and the Southwest end of the 295' Sub. Level.

During the period of shut down the timbers in parts of the mine were crushed so that it took considerable retimbering when the mine was opened.

AUSTIN SURFACE

The head frame at the Austin Shaft was remodeled and raised 11½ feet higher. The pulley stands were also remodeled to accommodate the new head frame and a bent erected for puffer shanty on the Northeast side of the shaft house. A new permanent trestle was also erected which extends from the shaft house to the Bessemer and non-Bessemer stocking grounds.

AUSTIN MINE.

ORE STATEMENT FOR DECEMBER 31ST, 1910.

	AUSTIN BESS.	AUSTIN	AUSTIN NO. 2	TOTAL	TOTAL LAST YEAR
On hand January 1st,	53,327	25,895	111,578	190,800	113,398
Output for year	46,949	4,270	19,916	71,135	203,129
Stockpile shortage applying on previous years	430		6,000	6,430	
Total	99,846	30,165	125,494	255,505	316,527
Shipments	88,403	30,130	70,054	188,587	125,727
Balance on hand	11,443	35	55,440	66,918	190,800
Decrease in ore on hand				123,882	

Mine idle from February 7th, 1910, to August 1st, 1910.

SHIPMENTS FOR 1910.

	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Austin Bessemer	33,545	54,858	88,403	108,766
Austin	5,188	24,942	30,130	8,505
Austin No. 2	4,971	65,083	70,054	8,456
Total	43,704	144,883	188,587	125,727
Total last year	95,770	29,957	125,727	
Increase - 50%			62,860	

AVERAGE MINE ANALYSIS OF OUTPUT.

GRADE	IRON	PHOS
Austin Bessemer	60.41	.046
Austin	61.10	.115
Austin No.2	61.06	.307

AVERAGE MINE ANALYSIS ON STRAIGHT CARGOES.

Austin Bessemer	All mixed
Austin	"
Austin No. 2	"

AUSTIN MINE.



AUSTIN MINE.

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31ST, 1910.

KIND	LINEAL FEET	AVG. PRICE PER FOOT	12 mos.	13 mos.
			1 9 1 0 AMOUNT	1 9 0 9 AMOUNT
6" to 8" Timber	8,816	.02	176.32	279.48
8" " 10" "	16,264	.04	650.56	1479.30
10" " 12" "	12,920	.0573	741.08	976.10
12" " 14" "	11,196	.0808	905.05	860.08
Total	41,196	.0502	2473.01	
Total 1909	79,474	.0452		3594.96

  

	LINEAL FEET	PER 100'	AMOUNT.	AMOUNT.
			1 9 1 0	1 9 0 9
5' lagging	148,780	.4653	692.00	2069.50
8' "	14,320	.5062	72.49	403.84
Poles	14,773	.9512	140.53	287.95
Total	177,873	.5087	905.02	
Total 1909				2761.29

  

	1 9 1 0	1 9 0 9
Feet of timber per ton of ore	.692	.391
Feet of lagging per ton of ore	2.29	2.780
Feet of lagging per foot of timber	3.315	7.107
Cost per ton for timber, lagging and poles	.047	.031
Equivalent of stull timber to board measure	127,601	173,495
Feet board measure per ton of ore	1.79	.854
Total product	71,135	203,129

  

Total cost of timber and lagging, 1910 - 12 mos.	3378.03
Total cost of timber and lagging, 1909 - 13 mos.	6356.25
Total cost of timber and lagging, 1908 - 12 mos.	7940.71
Total cost of timber and lagging, 1907 - 12 mos.	6522.69

AUSTIN MINE.

COMPARATIVE MINING COST FOR YEAR.

	12 mos. 1 9 1 0	13 mos. 1 9 0 9	INCREASE	DECREASE
<u>PRODUCT</u>	71,135	203,129		131,994
General Expense	.129	.094	.035	
Maintenance	.049	.033	.016	
Mining Expense	.780	.764	.016	
<u>Cost of Production</u>	.958	.891	.067	
<u>DEPRECIATION</u>				
Inventory	.018	.004	.014	
Improvement	.053		.053	
New Construction	.054	.020	.034	
Dep. Gwinn Buildings	.010	.010		
Gwinn Ass'n Building	.006		.006	
Fighting Forest Fires	.002		.002	
<u>Total Depreciation</u>	.143	.034	.109	
Taxes	.135	.042	.093	
Central Office	.038	.039		.001
<u>Cost on Stockpile</u>	1.274	1.006	2.68	
Loading and shipping	.088	.018	.070	
<u>Total cost on cars</u>	1.362	1.024	.338	
No. days operating	158	328		
No. shifts and hours	2-10-hr.	2-10-hr.		
Average daily product	450	619		
<u>COST OF PRODUCTION.</u>				
Labor	.734	.691	.043	
Supplies	.224	.200	.024	
<u>Total</u>	.958	.891	.067	

AUSTIN MINE.

STATEMENT OF COMPARATIVE WAGES.

	12 mos. 1910	13 mos. 1909	INCREASE	DECREASE
<u>SURFACE.</u>				
Total number of days	5,012 $\frac{3}{4}$	11,188 $\frac{3}{4}$		5,370 $\frac{1}{4}$
Average rate	2.22	2.13	.09	
<u>Amount</u>	11,154.87	23,839.20		12,684.33
<u>UNDERGROUND.</u>				
Total number of days	14,781 $\frac{1}{2}$	43,072 $\frac{1}{2}$		25,694 $\frac{1}{2}$
Average rate	2.73	2.64	.09	
<u>Amount</u>	40,407.06	113,584.16		73,177.10
Total days	19,794	54,261 $\frac{1}{4}$		31,064 $\frac{3}{4}$
Average rate	2.60	2.53	.07	
<u>Total Amount</u>	51,561.93	137,423.36		85,861.43
Labor cost per ton	.725	.676		

For comparison of days for twelve months, December, 1909, is omitted.

COMPARATIVE AVERAGE WAGES AND PRODUCT?

PRODUCT '10 - 71,135 tons	SURFACE		UNDERGROUND		T O T A L	
	1910	13 mos. 1909	1910	13 mos. 1909	1910	13 mos. 1909
Avg. no. men working	18	34	55	130	73	164
Avg. wages per day	2.22	2.13	2.73	2.64	2.60	2.53
Avg. wages per mo. 25 days	55.50	53.25	68.25	66.00	65.00	63.25
Avg. prod. per man per day	14.19	18.16	4.81	4.72	3.59	3.74
Labor cost per ton	.157	.117	.568	.559	.725	.676
Diff. in labor cost per ton	*.040	-.120	*.009	-.051	*.049	-.071
Avg. prod. breakg & tramng.			6.43	6.00		
Avg. wages for miners contract			2.82	2.74		
Avg. wages for trammers contract			2.38	2.37		
Total average wages for contract			2.76	2.68		

Avg. wages three months to March 31st, - \$2.42 } Average wages for year \$2.60  
 Avg. wages nine months to December 31st, - 2.54 } Increase in wages 4.9%.

Decrease in product per man per day 4.18%.

- minus \* plus.

AUSTIN MINE.

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND	QUANTITY	AVERAGE PRICES	12 mos.	13 mos.
			1 9 1 0 AMOUNT	1 9 0 9 AMOUNT
40% Powder	132.75	.925	1227.87	3653.77
50% "				288.08
60% "				141.46
Fuse	42,500	.378	160.76	480.77
Caps	12,020	.602	72.40	228.99
Cap Crimpers				1.52
Total			1461.03	4794.59
Product			71,135	203,129
Pounds Powder per ton of ore			.186	.214
Cost per ton for explosives			.020	.024

A motor was installed in the Austin engine room and two skips placed in balance in the shaft. The Austin steam hoist was built so as to connect with the motor and it has been running quite satisfactory, although at the point of connection the castings are rather weak and may have to be replaced with heavier material.

The ground to the Southeast and South of the shaft has continued to settle and a new fence was built to enclose dangerous ground.

#### STEPHENSON MINE

The product for December is as follows:

Stephenson Bessemer,	14,539	tons
Stephenson No. 2,	<u>4,555</u>	<u>tons</u>
Total,	19,094	tons

The production for the year was as follows:

Stephenson Bessemer,	176,745	tons
Stephenson No. 2,	<u>61,007</u>	<u>tons</u>
Total,	237,752	tons

All the ore from the Bessemer stockpile was shipped this season. The grades shipped from the pockets were Stephenson No. 2, 17,336 tons, Bessemer 101,333 tons.

#### THE MINE

The work for the year consisted in developing the Sub. Levels above the 2nd, 3rd and 4th levels and the main 4th level and sinking a Winze from the 4th to the 5th level and drifting from the bottom of this winze towards the shaft and the ore body.

The mining was confined to Sub. Levels above the 2nd, 3rd and 4th Levels, the East end of the 2nd and West end of the 3rd and 4th levels.

The product during the first few months of the year was small owing to the sand cave of Nov. 18th, 1909. Many of the main drifts in the levels and sub levels had to be cleaned out or abandoned. This work besides affecting the product added to the cost of mining.

The ore in sight December 31st was 761,553 tons as against 771,016 tons shown a year ago.

Electric Haulage was installed on the 3rd and 4th Levels and has proved very satisfactory.

#### SUBS. ABOVE 2ND LEVEL

280 - 290 FOOT SUBS. FOR DECEMBER

#### NO. 36 CONTRACT, M<sub>1</sub> RAISE

No. 36 put up M<sub>1</sub> Raise to 290' Sub. Level and drifted 17' East from top of its raise.

Work on Sub. Levels above 2nd Level for the year.

The work for the year consisted in removing all the ore on 230' Sub. Level from 2V and 2W Raises by Contracts No's 17 and 3 and from 240' Sub. Level, from 2V, 2U and 2Y Raises by Contracts No's 4, 14, 10, 15 and 17.

No. 25 stoped all the ore remaining on 240' Sub. Level from 2 P Raise, and Contracts No's 2, 6, 15, 4, 3, 14, 17 and 10 mined all ore on the 250' Sub. Level from 2W, 2Y and 2V Raises.

No. 25 stoped ore on 270' Sub. Level from 2 P Raise. The 280 - 270' Sub. Level was developed and on the East end of the mine all the ore was removed by contracts No's 5, 34, 38, 2, 15, 10, 4, 23 and 14. Contracts No's 11 and 45 cut out on 290' Sub. Level from 2 M and 2 N Raises and developed the Sub. Level from these raises. R<sub>1</sub> and R<sub>2</sub> Raises were put up to 280' Sub. Level and ore mined by Contracts No's 25 and 11.

#### MAIN 2ND LEVEL

The following Contracts have been working on the 2nd Level during December:

#### NO. 45 CONTRACT

No. 45 came down from 280' Sub. M Raise in early part of month and extended cross-cut opposite O Raise to the raise put up from 320' Sub. Level.

NO. 25 CONTRACT

No. 25 finished stoping on 280' Sub. Level R<sub>1</sub> Raise and then came down on main level and drifted 10' towards the boundary from cross-cut to R<sub>1</sub> Raise. It is now drifting East 10' from R<sub>1</sub> Raise.

NO. 11 CONTRACT

No. 11 started at 2 Q Raise and drifted North 25' to boundary thence East 15' along boundary.

NO. 10 CONTRACT

No. 10 raised from 310' Sub. Level and holed to 2nd Level South of Q Raise, then started under R<sub>2</sub> raise and drifted North 25' to boundary, then to the East and holed to No. 11.

CONTRACTS NO'S 14 AND 15

No's 14 and 15 are caving the main level 35' East of S Raise.

WORK FOR THE YEAR ON MAIN SECOND LEVEL

The Southeast foot-wall drift was extended 15' by No. 5 Contract at which point the deposit pinched out and the ore was then stoped from foot and hanging as far North as 2 "Y" Raise by Contract No's 5, 23, 17 and 15. A cross-cut was driven to hanging from a point 50' East of S Raise, by No. 34 Contract, and this drift was then extended along the hanging and holed to cross-cut Southwest of Y Raise. All the ore was then removed from this hanging wall drift North to the boundary by Contracts No's 34, 38, 14 and 15, a drift was also driven by No. 25 Contract. It started 60' West of 2 "Q" Raise and drifted 50' South and holed to old stope from 310' Sub.

SUB. LEVELS ABOVE 3RD LEVEL

WORK FOR DECEMBER ON SUBS. ABOVE 3RD LEVEL

310 - 320 FOOT SUB. LEVEL

NO. 21 CONTRACT, R RAISE

No. 21 is stoping 70' Northwest of its raise.

NO. 34 CONTRACT, T RAISE

No. 34 stoped in the early part of month 60' East of its raise, then cut out on East side of raise and drifted East 25' and holed to old drift.

NO. 2 CONTRACT, V RAISE

No. 2 extended last months drift and holed to old cross-cut from V Raise.

335 FOOT SUB. LEVEL

No. 7 and 39 continued stoping where they were working last month.

NO. 37 CONTRACT, S RAISE

No. 37 started a drift from cross-cut to T Raise around caved foot-wall drift. It is now repairing drift.

NO. 4 CONTRACT, V<sub>1</sub> RAISE

No. 4 finished stoping on 310' Sub. Level and is now stoping at bottom of its raise.

NO. 42 CONTRACT, V<sub>1</sub> RAISE

No. 42 put up raise to 310' Sub. Level from end of the cross-cut from V<sub>1</sub> Raise.

NO. 5 CONTRACT, V<sub>1</sub> RAISE

No. 5 put up raise to the 310' Sub. 30' North of No. 42 Raise.

NO. 3 CONTRACT, V<sub>1</sub> RAISE

No. 3 drifted 30' Northwest and 15' Northeast to the foot from point 15' from V<sub>1</sub> Raise.

NO. 43 CONTRACT, U<sub>1</sub> RAISE

No. 43 put up raise from 3rd level 25' Southeast of U Raise.



350 FOOT SUB.

NO. 12 CONTRACT

No. 12 continued stoping ore West of its raise.

NO. 16 CONTRACT, W RAISE

No. 16 cut out on hanging side of raise and drifted 12' Southwest. It then came back to raise and started drift to Northwest.

NO. 23 CONTRACT, X2 RAISE

No. 23 put up X2 Raise and cut out on foot side of raise and drifted East 7'.

WORK FOR THE YEAR ON SUB. LEVELS  
ABOVE 3RD LEVEL

No. 8 Contract extended the foot-wall drift from W Raise 125' to the Southeast, at which point the ore pinched out and the ore was then stoped by Contracts No's 3 and 18.

Foot wall drifts were driven from T and V Raises and holed by contracts No's 42 and 2, cross-cuts were also driven from this drift and holed to hanging wall drift at U Raise.

No. 10 Contract started in cross-cut from R Raise and drove a foot-wall drift to East and Southeast and holed to old hanging wall drift from R Raise.

335 FOOT SUB. LEVEL

In the West end of the mine Contracts No's 8, 12, 13 and 20 developed and mined all the ore on this Sub. Level West of 3 B Raise.

No. 8 Contract extended the footwall drift from M Raise 95' to the Northeast.

Hanging wall drifts were driven connecting all the raises on the East side from 3Q to 3V Raises. The greater part of this work was done by Contracts No's 6, 19, 7, 16, 11 and 43. All the ore on 335' Sub. Level, Southeast of 3 V Raise was mined by Contracts No's 9, 5, 3, 7 and 23.

#### 350 FOOT SUB. LEVEL

The 350' Sub. Level was developed from 3 A to 3 D Raises and practically all the ore, and mined by Contracts No's 8, 12, 23, 32 and 39.

On the East side of the mine Contracts No. 39 cut out on 350' Sub. Level from the hanging side of S Raise and drifted Southeast 50'.

No. 16 Contract cut in on 250' Sub. Level from W Raise and drifted Southwest 15' and Northwest 10'.

No. 2 Contract put up W<sub>1</sub> Raise and drifted Southeast 45' from top of its raise. Y Raise was put up to 250' Sub. by No. 18 Contract and foot-wall drifts driven to Northwest and Southeast by Contracts No's 17 and 18.

No. 23 put up X 2 Raise and from foot side of its raise drifted 20' to the East.

#### WORK ON MAIN 3RD LEVEL FOR DECEMBER

##### NO. 8 CONTRACT

No. 8 extended drift started last month to old stope. It is now caving main level 20' Southwest of B Raise.

##### NO. 17 CONTRACT

No. 17 is caving ore from hanging side of main level at X Raise.

##### NO. 18 CONTRACT

No. 18 drove cross-cut opposite X<sub>2</sub> Raise and holed to drift driven by No. 19 from top of 4 R Raise.

#### WORK ON 3RD LEVEL FOR YEAR

A cross cut was driven Southeast 115' by No. 21 Contract, from a point midway between 3 P and 3 Q Raises. This drift was then extended Easterly along the hanging 170' and holed to drift from top of 4 P Raise, a hanging wall drift was also driven by No. 2 Contract from cross-cut South of 3 V Raise. This drift was extended Northwest along the hanging 135' and holed to drift at top of 4 P Raise.

All the ore was stoped from foot and hanging by No. 8 Contract from the end of the East foot wall drift to a point 30' Northwest of 3 Y Raise. Contracts No's 17 and 23 drive cross-cuts to foot and hanging and are stoping ore North and South of X Raise.

On the West side of the 3rd level Contracts No's 8, 20 and 39 stoped ore on both sides of the main drift from a point 65 feet South of 3 D Raise to a point 20' North of 3 E Raise.

WORK ON SUB. LEVELS ABOVE 4TH LEVEL FOR DECEMBER

375 FOOT SUB.

NO. 40 CONTRACT, P RAISE

No. 40 extended last months drift 29' to hanging. Came back 10' and started drift to Southeast.

390 FOOT SUB.

NO. 27 CONTRACT, A RAISE

No. 27 started 22' in drift 10' South of Raise to 375' Sub. Level and drifted West and North around caved ground.

400 FOOT SUB.

NO. 28 CONTRACT, B RAISE

No. 28 drove cross-cut to drift from B<sub>1</sub> Raise, and is now drifting on foot 21' from its raise.

NO. 26 CONTRACT, B RAISE

No. 26 removed pillars on the right of last months drift and has started a drift from raise in pillar West of raise.

NO. 29 CONTRACT, C RAISE

No. 29 is stoping South of its raise.

NO. 30 CONTRACT, C RAISE

No. 30 is caving cross-cut Southeast of raise.

NO. 20 CONTRACT, I RAISE

No. 20 put up I Raise and drifted 10' Northwest from top of its raise.

WORK FOR YEAR ON SUB. LEVELS ABOVE 4TH LEVEL

375 FOOT SUB.

The work for the year on 375' Sub. Level consisted in driving cross-cuts from hanging wall drift, Northwest of 4 A Raise, to the foot and stoping the ore by Contracts No's 20, 27 and 32. No. 40 Contract also cut out on hanging side of 4 P Raise and drove cross-cut 65 feet to the Southeast.

390 FOOT SUB.

Hanging and foot wall drifts were driven on 390' Sub. Level between 4 B and 4 C Raises and all the ore removed by Contracts No's 30, 29, 28 and 27.

No. 26 Contract extended the hanging wall drift from A Raise 140' to the North, also drifted along the foot and removed pillar West of its raise.

Contract No. 35 put up G Raise and with Contract No. 31 developed and mined all the ore from G to F Raises.

400 FOOT SUB.

The 400' Sub. Level was cut out from B, B<sub>1</sub>, C, D and E Raises, and the various raises connected by hanging and foot wall drifts. This work was done by Contracts No's 28, 30, 24, 26 and 13. The 400' Sub. Level was also developed from 4 G Raise by Contract No. 31.

THE FOLLOWING CONTRACTS WORKED ON 4TH LEVEL DURING THE MONTH OF DECEMBER

NO. 1 CONTRACT

No. 1 went up on foot 35' at cross-cut started last month, then moved 180' Northwest and drifted up on foot 35'.

NO. 41 CONTRACT

No. 41 extended last months drift 15' to hanging, came back 15' and drifted 15' to the East.

NO. 33 CONTRACT

No. 33 extended last months drift 20' on the West side and is now repairing drift in No. 41 cross-cut.

No. 22 CONTRACT

No. 22 extended last months drift 40' along hanging.

NO. 35 CONTRACT

No. 35 is caving 75' South of E Raise.

NO. 31 CONTRACT

No. 31 is caving drift driven last month.

NO'S 24 AND 31 CONTRACT

No. 24 and 31 are removing pillar opposite F Raise.

WORK FOR YEAR ON 4TH LEVEL

4TH LEVEL - EAST SIDE

No. 41 Contract started 25' Southeast of 4 N Raise and drove a cross-cut 200' South to the hanging. It then moved 50' North and drifted 100' Southeasterly.

A tramming drift was driven in rock by Contracts No's 19 and 1. This drift was started at 4 Q Raise and ran parallel with and about 35' Northeast of the old foot wall drift. It was extended 390' to the Southeast and holed to old foot wall drift.

No. 1 Contract also extended its last years foot wall drift 30' to the Southeast and then drifted across the formation 50' to the Southwest. It then moved 50' to the Northwest of its last years breast and drove a cross cut 10' Southwest then came back and went up on foot 35 feet.

4TH LEVEL - WEST SIDE

The following work was done on the West side of 4th Level during the year. A cross-cut was started from foot-wall drift just Southeast of A Raise by No. 9 Contract and extended 80' to the Northeast from which point No. 33 Contract extended it 40' Northeast and thence 40' Easterly to the hanging. It then followed the hanging Southerly 180'.

No. 22 Contract started 20' North of 4 E Raise and drove Easterly to the hanging, then drifted Northerly along the hanging 140'.

Contracts No's 13 and 35 removed pillar between hanging and foot wall drift 80' South of E Raise.

The stub drift at D Raise was extended 40' to the Southwest in rock by Contract No. 24.

Old No. 16 drift was extended 150' South to the boundary by Contract No. 33. This contract then extended drift Northwest of G Raise and also removed small pillar around F Raise. The ore South of G Raise was stoped by Contract No. 31.

No. 35 Contract started 20' Southeast of F Raise and drifted Southeast 80'. Then with Contract No. 24 stoped back this drift taking ore to its left as it returned.

No. 40 Contract started at the end of No. 33's old drift and drifted to the West along the boundary 40', returned and drifted Easterly along boundary for 60'.

The stub drift at shaft was also extended in rock 60' to the West by No. 22 Contract, to extend tail room for motor haulage.

#### THE FOLLOWING WORK WAS DONE ON 5TH LEVEL DURING THE MONTH OF DECEMBER

##### NO. 9 CONTRACT

No. 9 extended its drift to the Southeast 35' and to the Northwest 20'.

##### WORK FOR THE YEAR ON 5TH LEVEL

A winze was sunk from 4th level for a vertical distance of 60' to the 5th level by No. 9 Contract. Drifts were then driven 80' to the Northwest and 50' to the Southeast.

##### STEPHENSON UNDERGROUND IN GENERAL

All the ore in the Southeast end of the 2nd level has been mined and we are now removing the ore along the Austin boundary and mining in the Sub. Levels below the 2nd level in the Southeast end of the deposit and removing the ore from foot and hanging in the extreme Southeast end of the main 3rd level.

Also mining on 400' Sub. Level and main 4th level on the West side of the mine. Two cross-cuts are being driven on the 5th level, one towards the shaft and one towards the ore body, the latter was passed through the granite to the slate and should soon encounter the contact of the slate and ore.

Since the sand run of November 1909, we have had nearly twice the volume of water to handle that we formerly had. We are now pumping regularly in the neighborhood of 10.25 gallons per minute.

#### STEPHENSON SURFACE

An addition was made to the Stephenson Mine Office and warehouse to provide Captains office and warehouse room.

A cesspool was also constructed near the North side of the office and sewer connections made with the launder at the Stephenson dry.

The grading at the South end of the stocking ground was extended to give more tail room for cars on the loading tracks.

The ditch for the Stephenson Mine water on Section 29 - 45 - 25 was extended to the Escanaba River.

A building for the top tram engine was erected just South of the main shaft house. Concrete foundation for engine constructed and engine installed.

Twenty-seven bents were erected on the West stocking trestle and 12 on the East. A new rock trestle erected and endless rope system for top tram installed.

#### PRINCETON MINE

The product for the month of December was as follows:

Princeton,	1,175 tons
Cambridge,	<u>8,974 tons</u>
Total,	10,149

The product for the year 1910:

Princeton,	7,404 tons
Cambridge,	<u>106,369 tons</u>
Total	113,773 tons

STEPHENSON MINE.

ORE STATEMENT FOR DECEMBER 31ST.

	BESSEMER	STEPHENSON	STEPHENSON NO. 2.	TOTAL	LAST YEAR
On hand January 1st, 1910	65,581	6,605	34,283	106,469	27,859
Output for year	119,803	28,321	64,201	212,325	142,916
Stockpile overrun applying on previous years	2,175			2,175	
Total	187,559	34,926	98,484	320,969	170,675
Shipments	171,258	34,798	19,670	225,726	64,206
Balance on hand	16,301	128	78,814	95,243	106,469
Increase in output corresponding 12 months - 58%				77,969	
Decrease in ore on hand				11,226	

SHIPMENTS FOR 1910

GRADE	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Bessemer	84,398	86,860	171,258	41,891
Stephenson	15,608	19,190	34,798	3,934
Stephenson No. 2	18,663	1,107	19,670	18,381
Total	118,669	107,057	225,726	64,206
Total last year	55,855	8,351	64,206	
Increase - 250%			161,520	

AVERAGE MINE ANALYSIS OF OUTPUT.

GRADE	IRON	PHOS.
Bessemer	59.53	.050
Stephenson	59.96	.095
Stephenson No. 2	59.46	.373

AVERAGE MINE ANALYSIS ON STRAIGHT CARGOES.

GRADE	IRON	PHOS.
Bessemer	(All mixed.)	
Stephenson	"	
Stephenson No. 2	"	



STEPHENSON MINE.

TIMBER STATEMENT FOR YEAR ENDING DECEMBER 31ST, '10.

KIND	LINEAL FEET	AVG. PRICE PER FOOT.	12 mos. 1 9 1 0 AMOUNT	13 mos. 1 9 0 9 AMOUNT
6" to 8" timber	25,264	.02	505.28	376.46
8" " 10" "	25,134	.0422	1060.20	677.88
10" " 12" "	23,886	.0595	1421.08	623.46
12" " 14" "	21,108	.0823	1738.30	1473.38
Total	95,392	.05954	4724.86	
Total 1909	68,060	.0463		3151.18

	LINEAL FEET	PER 100'	AMOUNT 1 9 1 0	AMOUNT 1 9 0 9
5 ft. lagging	419,250	.465	1950.00	1174.00
7 ft. "				5.93
8 ft. "	105,514	.424	447.08	233.29
Poles	77,188	.950	733.30	864.22
Total	601,952	.521	3130.38	
Total 1909	390,981	.583		2277.44

	1 9 1 0	1 9 0 9
Feet of timber per ton of ore	.449	.476
Feet of lagging per ton of ore	2.47	2.73
Feet of lagging per foot of timber	5.50	5.74
Cost per ton for timber, lagging and poles	.037	.038
Equivalent of stall timber to board measure	243,192	178,320
Feet board measure per ton of ore	1.14	1.24
Total product	212,325	142,816
Total cost of timber and lagging, 1910 - 12 months		7855.24
Total cost of timber and lagging, 1909 - 13 months		5428.62
Total cost of timber and lagging, 1908 - 12 months		4918.31

STEPHENSON MINE.

STEPHENSON MINE.

COMPARATIVE MINING COST FOR THE YEAR.

	12 mos. 1 9 1 0	13 mos. 1 9 0 9	INCREASE	DECREASE
<u>PRODUCT</u>	212,325	142,816	65,909	
General Expense	.111	.114		.003
Maintenance	.061	.182		.121
Mining Expense	1.062	1.067		.005
<u>Cost of Production</u>	1.234	1.363		.129
<u>DEPRECIATION.</u>				
Inventory	.008	.021		.013
Depr. Gwinn Buildings	.010	.010		
Improvement	.059		.059	
New Construction	.018	.029		.011
Opening Mine	.250	.250		
Gwinn Association Bldg.	.006		.006	
<u>Total Depreciation</u>	.351	.310	.041	
Taxes	.043	.037	.006	
Central Office	.045	.055		.010
<u>Cost on Stockpile</u>	1.673	1.765		.092
Loading and Shipping	.025	.015	.010	
<u>Total cost on cars</u>	1.698	1.780		.082
No. days operating	298	319		
No. shifts and hours	2-10-hr.	2-10-hr.		
Average daily product	713	448		
<u>COST OF PRODUCTION</u>				
Labor	.935	.982		.047
Supplies	.299	.381		.082
<u>Total</u>	1.234	1.363		.129

STEPHENSON MINE.

STATEMENT OF COMPARATIVE WAGES.

	12 mos. 1910	13 mos. 1909	INCREASE	DECREASE
<u>SURFACE</u>				
Total number of days	15,187 $\frac{1}{4}$	13,153	3,526 $\frac{3}{4}$	
Average rate	2.29	2.27	.02	
<u>Amount</u>	34,766.25	29,867.26	4,898.99	
<u>UNDERGROUND</u>				
Total number of days	61,003 $\frac{1}{2}$	42,637 $\frac{1}{4}$	21,054 $\frac{3}{4}$	
Average rate	2.62	2.49	.13	
<u>Amount</u>	159,922.08	106,389.46	53,532.62	
Total days	76,190 $\frac{3}{4}$	55,790 $\frac{1}{4}$	24,581 $\frac{3}{4}$	
Average rate	2.55	2.44	.11	
<u>Total amount</u>	194,688.33	136,256.72	58,431.61	
Labor cost per ton	.917	.954		.037

For comparison of days for twelve months, December, 1909, is omitted.

COMPARATIVE AVERAGE WAGES AND PRODUCT.

PRODUCT '10 212,325 tons	SURFACE		UNDERGROUND		T O T A L	
	1910	13 mos. 1909	1910	13 mos. 1909	1910	13 mos. 1909
PRODUCT '09 142,816 "						
Avg. no. men working	.51	40	206	131	257	171
Avg. wages per day	2.29	2.27	2.62	2.49	2.55	2.44
Avg. wages per mo. 25 days	57.25	56.75	65.50	62.25	63.75	61.00
Avg. prod. per man per day	13.99	10.86	3.48	3.35	2.79	2.56
Labor cost per ton	.164	.209	.753	.745	.917	.954
Diff. in labor cost per ton	-.045	-.092	*.008	-.217	-.037	-.309
Avg. product breakg. & trammg.			5.95	5.15		
Avg. wages for miners contract			2.72	2.61		
Avg. wages for contract trammers			(None - Electric Haulage.)			
Total average wages for contract			2.72	2.61		

Increase in wages 5.7% effective from April 1st, 1910. Increase in product per man per day - 9%.

- minus \* plus.

STEPHENSON MINE.

STATEMENT OF EXPLOSIVES USED FOR BREAKING ORE.

KIND	QUANTITY	AVERAGE PRICES	12 mos. 1910 AMOUNT	13 mos. 1909 AMOUNT
40% Powder	51,100	.0925	4722.05	2266.27
50% "	3,400	.1026	348.92	1856.54
60% "	850	.1125	95.63	
Fuse	166,100	3.78	627.80	462.77
Caps	41,700	6.04	252.81	179.32
Cap crimpers	2	.30	.60	6.04
Total			6047.81	4770.94
Product			212,325	142,816
Pounds powder per ton of ore			.261	.300
Cost per ton for explosives			.0284	.0334

40,893 Tons were shipped from Cambridge stockpile and 48,549 tons from Cambridge pocket.

#### THE MINE

Three Contracts have been stoping at No. 1 shaft Section 18 throughout the year and the eight level which had reached the Section 19 boundary at the close of the year was extended on Section 19 and connected with 6th level drift from No. 2 shaft. All the water from No. 2 shaft is now carried through this drift to No. 1 Shaft.

An electric pump was installed at No. 1 shaft which handles all the water from both shafts.

At No. 2 Shaft the work consisted in developing the 5th and 6th levels and Sub. Levels above these levels, and work has been started on putting up a timber raise from the South end of the 5th level. The mining was confined to Sub. Levels above the 5th level, North end of the 5th Level and 335' Sub. Level (old No. 22 drift) in the North end of the mine.

Electric haulage was installed on 5th level No. 2 Shaft in October.

The estimated ore in sight at both shafts shows 1,136,462 net tons as against 1,179,978 tons shown a year ago.

#### NO. 1 SHAFT

#### WORK FOR DECEMBER

#### 6TH LEVEL ON SECTION 20.

#### NO. 3 CONTRACT

No. 3 finished removing pillar from level above. Then stoped up on foot under this old pillar on left side of cross-cut. No. 1 coming back to within 20' of main drift.

6TH LEVEL SECTION 18

NO. 1 CONTRACT

No. 1 continued in its stope extending it 5' Northwest. Then it came back to the main drift and moved 58' West and drifted 40' Northerly.

NO. 9 CONTRACT

No. 9 continued in its stope removing pillar to Northeast.

WORK FOR THE YEAR ON 6TH LEVEL

Consisted in stoping ore in Sub. Level above 6th Level North-east of the shaft by No. 9 Contract, removing pillars along old hanging wall drift in the South end of the mine by Contracts No's 3 and 1 and mining on Section 20 by Contract No. 3.

7TH LEVEL

There is no work being done on the Seventh level at the present time. The work for the year consisted in stoping the ore which remained in the East end of the level.

8TH LEVEL

There is no work being done on the 8th Level at the present time.

WORK FOR YEAR ON 8TH LEVEL

The eight level was extended on Section 19 by No. 5 Contract and holed to a drift from 6th level No. 2 shaft. No. 5 Contract also put up a raise from the eight level near the boundary of Section 18 and holed to 6th level (No. 22 drift).

NO. 2 SHAFT

SUBS. ABOVE 5TH LEVEL

FOR DECEMBER

. 210 FOOT SUB.

NO. 24<sup>B</sup> CONTRACT, 0 RAISE

No. 24 B finished removing ore left in pillar on hanging side between No. 1 and No. 2 cross-cut.

NO. 24 D CONTRACT, O RAISE

No. 24 D Contract caved back from cross-cut No. 1 to turn to North removing ore to its right as it returned. Then moved to top of its raise and drifted 18' Northeast, thence 10' Southeast.

200 FOOT SUB. ABOVE 225' FOOT SUB.

NO. 10 CONTRACT, RAISE

No. 10 extended its last months drift Easterly for 30', thence North for 33' to hanging.

NO. 19 CONTRACT R<sub>o</sub> RAISE

No. 19 repaired drift off of raise, then 25' from raise drifted 15' East to hanging, then caved old drift to this point.

NO. 23 A CONTRACT, T<sub>a</sub> RAISE

No. 23 A Caved back drift from R<sub>o</sub> Raise to within 30' of its raise taking all ore on the hanging side.

225 FOOT SUB.

NO. 21 CONTRACT, Q RAISE

No. 21 continued to cave back within 40' of its raise. As it returned took all ore to old drift on its left and to hanging on its right.

NO. 6 A CONTRACT, Q<sub>1</sub> RAISE

No. 6 A caved back last months drift to within 38' of turn to raise. Then 28' from turn drifted Northeast for 15'.

NO. 6 B CONTRACT, Q<sub>1</sub> RAISE

No. 6 B caved back No. 6 A's drift starting from turn to Q<sub>1</sub> Raise and caved to the Southwest as far as old drift to East.

NO. 12 CONTRACT, T RAISE

No. 12 in early part of month extended its drift Southerly for 35' to R<sub>o</sub> Raise, then moved to drift to East off of top of T Raise and 20' from extended it Easterly for 20'.

WORK FOR THE YEAR ON 5TH LEVEL SUBS.

Most of the <sup>ore</sup> mined at No. 2 shaft was taken from the 5th level Subs. The balance of ore left on 240' Sub. Level as far South as N Raise was removed early in the year by Contracts No's 2 and 10. These contracts then cut out on 240' Sub. Level from M and N Raises and developed the Sub. Level from their respective raises and have mined all the ore to a point about midway between M and N Raises.

The pillar around L Raise was stoped by Contract No. 11 early in the year.

On the 280' Sub. No. 26 removed ore around C Raise and then went down to main 5th Level and has been stoping ore from foot from A to D Raise.

The 280' Sub. Level was extended from K to L Raise and all ore removed between foot and hanging from J to L Raise by Contracts No's 12 and 8.

No. 8 Contract also cut out on 285' Sub. and removed all the ore between J and K Raises.

All the ore on 185' - 190' Sub. Levels was removed by Contract No. 19.

The 200' Sub. Level was developed from R<sub>c</sub> to T<sub>a</sub> Raises and the greater part of the ore removed by Contract No's 24 A, 24 B, 24 C and 24 D.

Three raises were put up from the 5th level to the 225' Sub. Level and drifts driven connecting the various raises. Mining was also carried on in the East end of the Sub. The greater part of this work was done by Contracts No's 6, 10, 11, 12, 21 and 29.

5TH LEVEL

WORK FOR DECEMBER

NO. 2 CONTRACT

No. 2 extended its drift 32' Southeast along right side of old drift.



#### NO. 4 CONTRACT

No. 4 started about the middle of the month and extended its drift from a point opposite W Raise Northwest for 17'.

#### WORK FOR THE YEAR ON 5TH LEVEL

The development work on the 5th consisted in extending No. 16's hanging wall drift along the hanging 125' to Southwest and then drifting to the South to connect with No. 4's foot wall drift which was extended Westerly along the foot 235', a turn out was made in this drift 50' West of V Raise to form loup for motor haulage. This turn out was extended by No. 4 to the North and holed to No. 16. No. 4 also took up floor of drift from point of holing to No. 16 to V Raise on the East and W Raise on the West.

A tramming drift was also driven from R Raise 50' to the West by No. 28 Contract and holed to No. 4 foot-wall drift. No. 28 then moved to point where main drift turns off to Q Raise and drifted Southwest 70' and holed to its drift at R Raise.

A drift was started at Q Raise by No. 22 Contract and extended in rock 160' to Southeast, from the end of the drift a timber raise is being put up and will be extended to surface. A drift was started 10' Northwest of K Raise by No. 2 Contract and extended Southeasterly 150'.

Contract No's 15 and 29 extended cross-cut from shaft 110' and also excavated for motor pit near the end of this drift.

The mining on the fifth level consisted in stoping ore from foot from A to D Raises by No. 26 Contract and removing pillar in the North end of the mine by Contracts No's 15 and 16.

#### WORK FOR DECEMBER

#### SUB. LEVELS ABOVE 6TH LEVEL

#### 335 FOOT SUB.

#### NO. 15 CONTRACT, X RAISE

No. 15 caved last months drift between 2 and 3 cross-cuts, then took another slice for 33' and caved same. It is now in 22' with another slice.

NO. 16 CONTRACT, X RAISE

No. 16 extended its drift started last month 35' to cross-cut No. 4. Then went up on foot for 20' came back to turn and moved Northwest 25' and drifted Northeast for 10'.

350 FOOT SUB

NO. 25 CONTRACT, U RAISE

No. 25 extended its drift 58' holing to drift off B Raise.

WORK FOR YEAR ON 6TH LEVEL SUB LEVELS

Hanging wall drifts were driven by Contracts No's 22 and 25 from X to B Raises. The hanging wall drift from X Raise on the North was extended by No. 7 Contract along hanging 156' and then Northwesterly between foot and hanging 74' and holed to old No. 22 drift from No. 1 shaft.

No. 27 drifted North from top of its square set raise for 50' to foot, then came back 22' and put up another tier and drifted North 30' to hanging, came back 15' and drifted North and holed to No. 7 drift from X Raise. A drift was driven from the top of Y Raise 110' Easterly by No. 16 Contract and drift holed to No. 7.

No. 14 Contract put up W Raise to 225' Sub. Level and drifted Northeasterly 125' then raised and holed to F cross-cut on 5th level.

WORK FOR DECEMBER

6TH LEVEL

NO. 20 CONTRACT

No. 20 extended its drift 28' to ore making turn to Southwest.

NO. 17 CONTRACT

No. 17 extended its drift 16' to "Y" cross-cut, then moved to other side of Y cross-cut and drifted Northwest for 15'.

NO. 14 CONTRACT

No. 14 put up E<sub>2</sub> Raise 36' above back of level 12' through clean ore and the balance through seams of lean Jasper and ore.

#### WORK FOR THE YEAR

On the South side No. 20 extended its hanging wall drift 100' to the Southwest and its foot-wall drift in rock 375' to the Southeast at which point a turn out was made and a cross-cut driven to the Southwest to the ore body.

No. 14 in the early part of the year put up E Raise 40' in rock, then started 20' Southeast of turn to No. 20 foot-wall drift and drifted Southwest 115' at which point it encountered the ore that was shown up in No. 1 drill hole. It then extended its drift 90' in ore to the hanging and followed the hanging 35' to Southeast. Then moved 80' Northeast of turn and drove a drift Westerly 35' to hanging. Then came back to its main drift and drove a drift to Southeast 110' in ore and holed to No. 20 near E<sub>2</sub> Raise. It then put up E<sub>1</sub> Raise 9' to hanging and E<sub>2</sub> Raise 15' to hanging.

On the North side of 6th level a hanging wall drift was started by No. 27 Contract from a point 145' Southwest of forks of main foot-wall drift and extended to the Northwest connecting V, W, X and Y cross-cuts.

No. 27 Contract extended its drift along the boundary of Section 19 to the North 65' and then to the Northwest on Section 19 and holed to No. 5 Contract 8th level No. 1 Shaft.

#### PRINCETON MINE - UNDERGROUND IN GENERAL

The developments during the year on the 6th level No. 2 Shaft and on the 8th Level No. 1 Shaft, placed the mine in good condition for future work. The 6th level foot-wall drift, to the Southeast, is now advanced to a point well under the 5th level ore body. A raise will at once be started to hole into the 5th level.

The 8th level from No. 1 Shaft crossed the Northeast corner of Section 19 and will be the means by which the ore from the Northwest lease on the N.E.  $\frac{1}{4}$  of the N.E.  $\frac{1}{4}$  of Section 19, will be mined. This drift also acts as a permanent opening between No. 1 and No. 2 shafts, and through which the water from No. 2 is now flowing to No. 1 Shaft.

The work of retimbering No. 2 shaft was continued night shift throughout the month.

Timber has been ordered and work started on timber raise in the South end of 5th level.

#### PRINCETON SURFACE

There has been very few changes on the Princeton Surface the past year.

Electric Motors were installed at both No. 1 and No. 2 engine houses and we are hoisting by electricity at both No. 1 and No. 2 shafts.

An electric motor was installed for top tram at No. 2 shaft but the motor was found too small to do the work and the steam top tram engine used last year was replaced until a larger motor can be installed.

There was little Cambridge ore shipped from the stockpile during the past season as a consequence the ore has to be stocked this winter by side dumping. This necessitates moving the track occasionally and requires two extra men on the stockpile.

A hose house was erected just North of the dry.

On the South end of the Princeton property near the Central Power Plant the surface was cleared of brush for fire protection.

#### SMITH MINE

The work for the year consisted in extending the crosscuts on the 1st, and, 3rd and 4th levels, sinking the shaft, and cutting out plats on the 5th and 6th levels. The volume of water increased to such an extent that drifting on all the levels was stopped July 25th until larger pumps could be installed. Sinking was resumed August 3rd.

PRINCETON MINE.

ORE STATEMENT FOR DECEMBER 31ST..

	PRINCETON	CAMBRIDGE	TOTAL	TOTAL LAST YEAR
On hand January 1st '10	28,094	177,441	205,535	103,588
Output for year	7,404	108,378	115,782	144,882
Total	35,498	285,819	321,317	248,470
Shipments		89,442	89,442	42,935
Balance on hand	35,498	196,377	231,875	205,535
Decrease in output corresponding 12 months - 14%			18,922	
Increase in ore on hand			26,340	

SHIPMENTS FOR 1910.

	POCKET	STOCKPILE	TOTAL	TOTAL LAST YEAR
Princeton	0	0	0	0
Cambridge	48,549	40,893	89,442	42,935
Total	48,549	40,893	89,442	42,935
Total last year	34,810	8,125	42,935	
Increase - 108%			46,507	

AVERAGE MINE ANALYSIS OF OUTPUT.

GRADE	IRON	PHOS.
Princeton	60.67	.172
Cambridge	59.91	.678

AVERAGE MINE ANALYSIS ON STRAIGHT CARGOES.

GRADE	IRON	PHOS.
Cambridge	(All mixed.)	

PRINCETON MINE.

TIMBER STATEMENT FOR THE YEAR ENDING DECEMBER 31ST, '10.

KIND	LINEAL FEET	AVG. PRICE	12 mos. 1910 AMOUNT	13 mos. 1909 AMOUNT
4" to 6" timber				35.04
6" " 8" "	14,176	.02	283.52	70.60
8" " 10" "	25,799	.0425	1,096.46	757.36
10" " 12" "	36,832	.0594	2,187.36	1,748.12
12" " 14" "	13,189	.0815	1,075.56	1,390.16
Total	89,996	.0516	4,642.90	
Total 1910	75,129	.0532		4,001.28

	LINEAL FEET	PER 100 FT.	AMOUNT 1910	AMOUNT 1909
5 ft. lagging	215,645	.476	1,005.80	1,233.50
7 ft. "	75,000	.500	375.00	365.42
8 ft. "	81,360	.434	298.16	311.35
Poles	87,655	.950	832.72	742.75
Total	459,660	.648	2,511.68	
Total 1909	501,224	.529		2,653.02

	1910	1909
Feet of timber per ton of ore	.777	.518
Feet of lagging per ton of ore	3.21	1.953
Feet of lagging per foot of timber	4.13	5.63
Cost per ton for timber, lagging and poles	.062	.046
Equivalent of stull timber to board measure	229,145	216,635
Feet Board measure per ton of ore	1.98	1.50
Total product	115,782	144,882

Total cost of timber and lagging, 1910 - 12 mos.	7,154.58
Total cost of timber and lagging, 1909 - 13 mos.	6,654.30
Total cost of timber and lagging, 1908 - 12 mos.	5,281.08
Total cost of timber and lagging, 1907 - 12 mos.	8,730.49

PRINCETON MINE.

COMPARATIVE MINING COST FOR YEAR.

	12 mos. 1910	13 mos. 1909	INCREASE	DECREASE
<u>PRODUCT</u>	115,782	144,882		29,100
General Expense	.110	.086	.024	
Maintenance	.106	.085	.021	
Mining Expense	1.240	1.009	.231	
<u>Cost of Production</u>	1.456	1.180	.276	
<u>DEPRECIATION.</u>				
Gwinn Ass'n Bldg.,	.006		.006	
Inventory	.004	.004		
Improvement	.004		.004	
New Construction	.033	.029	.004	
Cost of Mine	.100	.100		
Depr. Gwinn Buildings	.010	.010		
Fighting Forest fires	.001		.001	
<u>Total</u>	.158	.143	.015	
Less credits	.003		.003	
<u>Total Depreciation</u>	.155	.143	.012	
Taxes	.103	.067	.036	
Central Office	.053	.048	.005	
Cost on Stockpile	1.767	1.438	.329	
Loading and shipping	.030	.010	.020	
<u>Total cost on cars</u>	1.797	1.448	.349	
No. days operating	302	329		
No. shifts and hours	1-10-hr.	1-10-hr.		
Avg. daily product	383	440		
<u>COST OF PRODUCTION.</u>				
Labor	1.052	.857	.195	
Supplies	.404	.323	.081	
<u>Total</u>	1.456	1.180	.276	

PRINCETON MINE.

STATEMENT OF COMPARATIVE WAGES.

	12 mos. 1 9 1 0	13 mos. 1 9 0 9	INCREASE	DECREASE
<u>SURFACE</u>				
Total number of days	10,358 $\frac{3}{4}$	11,219 $\frac{3}{4}$	20 $\frac{3}{4}$	
Average rate	2.36	2.29	.07	
<u>Amount</u>	24,480.50	25,743.74		1,263.24
<u>UNDERGROUND</u>				
Total number of days	36,498 $\frac{1}{2}$	36,973 $\frac{1}{2}$	2,348 $\frac{1}{2}$	
Average rate	2.58	2.55	.03	
<u>Amount</u>	94,170.33	94,565.99		395.66
Total days	46,857 $\frac{1}{4}$	48,193 $\frac{1}{4}$	2,369 $\frac{1}{4}$	
Average rate	2.53	2.49	.04	
<u>Total amount</u>	118,650.83	120,309.73		1,658.90
Labor cost per ton	1.026	.83	.43	

For comparison of days for twelve months, December, 1909, is omitted.

COMPARATIVE AVERAGE WAGES AND PRODUCT.

	SURFACE		UNDERGROUND		T O T A L	
	1910	13 mos. 1909	1910	13 mos. 1909	1910	13 mos. 1909
PRODUCT '10 - 115782 tons						
PRODUCT '09 - 144882 "						
Avg. no. men working	34	33	117	110	151	143
Avg. wages per day	2.36	2.29	2.58	2.55	2.53	2.49
Avg. wages per mo. 25 days	59.00	57.25	64.50	63.75	63.25	62.25
Avg. prod per man per day	11.17	12.91	3.17	3.92	2.47	3.06
Labor cost per ton	.212	.177	.814	.653	1.026	.830
Diff in labor cost per ton	*.035	-.031	*.161	-.009	*.196	-.022
Avg. prod. breakg & tramng			4.51	5.35		
Avg. wages for miners contract			2.71	2.72		
Avg. wages for trammers contract			2.36	2.31		
Total avg. wages for contract			2.64	2.65		

MEMO.: - Increase in wages 3.7% effective from April 1st, 1910.

Decrease in product per man per day...19%.

- minus \* plus.

PRINCETON MINE.