GM 00998

REPORT ON THE WEEDON MINE

Documents complémentaires

Additional Files

Licence

License

C
O
P
Y

REPORT

ON

THE WEEDON MINE

FONTAINEBLEAU, QUEBEC

Toronto,
April 7, 1930.

BY W.F. JAMES

Weedon Tp.

SUMMARY AND CONCLUSIONS

1. Work done includes a study of the available information concerning Weedon orebody, of conditions under which it was formed and of the possibilities of the surrounding district.

2. The information set forth concerning the Weedon orebody is compiled from a private report written by C.W. Cushman, formerly manager of the Weedon property, and from an official report written by J.A. Bancroft. Other information is based on an examination made during the period September-November, 1929.

3. Weedon Mine, though records are inadequate, appears to contain still sufficient copper ore of fair grade to warrant a salvage operation to recover it. In addition, there is a considerable but unknown quantity of 2% ore. The incomplete information available strongly suggests that this quantity will be sufficiently large to warrant construction of a small concentrator. Besides what low grade ore is known to be still in the mine, there is a possibility of developing a considerably larger tonnage.

4. The valuable content of the Weedon ore consists of copper, sulphur, silver and gold. The grade of the richer material recoverable as specified in Mr. Cushman's report may be assumed to be the average grade shipped from the mine over a long period of years: copper 3.6%, sulphur 40.7%; gold 0.01 oz., silver 0.46 oz., with the probability that the copper content at best will be up to 0.5% higher. The valuable content of the low grade ore in addition to its copper is unknown. The low grade ore is located chiefly on the margins of the main orebody.

5. It is improbable that the high grade Weedon orebody persists for any significant distance in either direction beyond the present known limits.

6. The so-called footwall vein lying west of the main vein extends from the surface or close to it, as far as the 13th level. Intersections of it show it to be of fair grade but narrow widths, but enough work has not yet been done to determine the length and depth of the vein.

7. Besides the possibility of profitable extraction of the ore in the main vein, there is also the possibility of locating ore bodies in the vicinity of the mine. Dip needle exploration to date has indicated areas which may be underlain by sulphide bodies. The location of these areas relative to the geology is interesting as it indicates that the possible bodies lie along a contact zone similar to that in which the main orebody occurs.

8. In the opinion of the writer, these magnetic areas warrant diamond drill exploration.

RECOMMENDATIONS.

1. Acquisition of two year options on mineral rights of all lots in Range II southwest of the mine as far as Salmon river. Lots optioned can be evaluated within the next two years and the undesirable options dropped.

2. Further dip needle work in selected areas.

3. Diamond drilling where magnetic surveys have indicated the presence of areas of metallic mineralization. The indications should be cut at relatively shallow depths, say 75 feet below surface.

4. That the mine workings be dewatered and the value of the remaining ore actually determined. The potentialities of the low grade ore occurrence should be determined by drilling of workings. The amount of development done on the low grade will depend on results obtained, but this problem should be decided before steps are taken to remove any of the high grade as a salvage operation, which cannot be attempted until plans can be made to abandon the workings. A decision can then be reached as to how much low grade ore, if any, is to be removed before extraction of the high grade remnants.

INTRODUCTION

Following the completion of operations at the Weedon mine in 1921, the situation was that the bulk of the accessible high grade ore had been removed, leaving only what high grade material might be recovered by salvage operations but the possibility of developing a considerable amount of low grade ore of approximately 2% copper content. Development up to 1921, at which time the mine closed down, indicated that a considerable width of this latter grade lay on the hanging wall of the main orebody and it was known that further amounts lay to the south of the main orebody. There appeared the possibility that a sufficient tonnage of this grade of ore might be proved up to warrant the construction of a concentrator, provided, that, in addition, the sulphur content of the ore might be recovered and marketed.

At the beginning of this examination, the general geology of the locality seemed to the writer favourable for the occurrence of other ore bodies and it was decided to study the conditions under which the main orebody occurred, so far as this could be done from surface examination, and to examine the surrounding area to see if elsewhere similar conditions existed under which the occurrence of a like orebody might be expected. The examination of the property and the surrounding area was made with this purpose in view.

LOCATION AND PROPERTY

Weedon Mine is located in the eastern section of the Village of Fontainebleau, Weedon township, Wolfe county, in the Eastern Townships of the Province of Quebec.

The distance by road to Weedon from the City of Sherbrooke is 39 miles and from the City of Quebec is 99 miles. The mine is about 4½ miles east of Weedon, Weedon being a town of 2500 and Fontainebleau a village of 500 people.

The Weedon Mine property comprises lots 22A, B, C, and D, in Range II, Weedon township, and 22A and B in Range III. The ownership of the mining rights in Range III is not definitely decided but, from the best information available, the mining rights in range III belonging to the company extend from 20B to 22B. The area over which the Company holds both surface and mining rights comprises approximately 430 acres.

Regarding titles in this district, there are a good many complications, due chiefly to faulty registration. Another complication exists in the reputed ownership of a part of the mining rights in Range II by the British-American Land Company, an English organization which received certain rights in return for colonization work a good many years ago. Throughout the district there has been a good deal of buying and selling of mining rights apart from the surface rights.

The country is well supplied with good roads. The Quebec Central Railway maintains a regular passenger and freight service through Weedon. Telephone and telegraph communications are good and the district is supplied with ample hydro-electric power developed near-by.

Timber for construction may be purchased cheaply in the neighbourhood; the supply of fuel wood is adequate and cheap.

The present water supply of the mine is brought by gravity from springs and small streams in the hills above.

TOPOGRAPHY

The topography of the country is rolling. Weedon is located about 815 feet above sea level and the higher hills near-by extend up to 1300 and 1400 feet. The granite hills east of the mine are the highest in the vicinity. The hills and valleys have a very definite trend north-east and south-west, following the geological structure of the country. The township surveys, roads and major streams are all oriented in this direction. The proporrion of outcrops is fair. Much of the country has been cleared for forming but these areas are, naturally, not the rocky sections.

BUILDINGS AND EQUIPMENT

The location of the various buildings on the property are shown on the accompanying fifty foot plan. All buildings have deteriorated considerably and would require considerable in the way of repairs. The bunk house and four dwelling houses are in fair condition and could be made livable at reasonable expense.

Much of the machinery has been removed, except for a compressor which has been kept under cover. An aerial tramway 19,500 feet in length extends from the shaft to the railway near Weedon. Some of the towers of this tramway have fallen and most

of the lower structures are badly decayed. The cable, in certain places where it has been lying on the ground, is badly rusted. It is not to be expected that any great part of this tramway will be usable.

RECORDS

Very little detailed information on underground workings is available. The accompanying survey plans cover approximately all developments except diamond drilling, but assay plans are available only for part of the upper levels. It is reported at the mine that the bulk of the records were sent to some of the principal owners of the old Company, presumably at Portland, Maine. It is of the utmost importance that these records be secured as they will obviate great expense in evaluating the reserves.

HISTORY

The discovery of the Weedon property was made in 1909 on lot 22, Range II. For more than a year previous to this time, Mr. John McDonald had done work upon the rusty pyritic schists south-east of the present orebody. In this locality he had sunk several pits without discovering much but pyrite. Upon sinking a pit in a drift-covered depression near the present No. 3 shaft, he encountered massive chalcopyrite. The property was then leased under option to Dr. Pierre Ricketts of New York, who, in turn, transferred it to the Eastern Canada Smelting Co. Mr. McDonald is said to have received $100,000 (one hundred thousand dollars) for the property. After a number of transfers, the property came into the hands of the Weedon Mining Co., which was composed of Messrs. C.H. & J.S. Maxcy, L.D. Adams and Mr. Lewis. This company retained ownership of the property and operated it until 1921 . Up until the end of operation the mine produced 584,677 tons of a probable average content of 3.5% copper and 40% sulphur. The maximum year's production was made in 1916 when 93,677 tons were produced.

It is rather remarkable that during the whole course of mining, no rock waste was accumulated until the final development below the orebody. The material mined consisted almost wholly of sulphides, all of which was shipped for recovery of copper and sulphur content.

The most detailed information on the property is given in a report written by Mr. C.W. Cushman, who was manager at the time the property was shut down, but considerable information is also available in a report written for the Quebec Provincial Government by Mr. J.A. Bancroft and published by the Quebec Department of Mine in 1915. The title of the report is "The Copper Deposits of the Eastern Townships".

GEOLOGY OF THE DISTRICT

As is described in the accompanying report, there occur in the Eastern Townships three zones or bands of igneous rock enclosed within the Paleozoic formations of the district. The zones are of importance in that they contain the most important copper occurrences of the section. The rocks composing these zones have been called Pre-cambrian in age without, it appears, adequate reason. In the Weedon area in particular, there is good reason for considering these rocks conformable with certain of the Paleozoics and interbedded with them. Cutting all these rocks are intrusive ranging in composition from acid porphyries and granites to very basic types.

The Weedon area lies within one of these igneous belts. The belt extends about 20 miles across Weedon and Stratford townships and is approximately two miles wide. In general, it is lithologically similar to the other zones. Within Stratford township the zone consists of alternations of bands of acid and basic schists. A similar composition prevails in Weedon township as far south-west as Salmon river. North of Weedon Mine the zone forks and a second band of igneous schist a few hundred feet wide, extending to within a short distance of Salmon river, is separated from the main band by a width of several hundred feet of Paleozoic sediments. South-west of Salmon river the character of the band changes. To the north is a band of acid schisted rock, several hundred feet wide. Some of it is definitely fragmental, while other parts of the band appear to be sheared rhyolite porphyries. South of it is a band, similar in width, of granite rock and to the south again a band of sheared and chloritized rock which is apparently an altered lava. The general strike and dip of the schistosity planes corresponds with that of the igneous band, being generally between north and north-east with a dip of about 45° to the east.

Later intrusives cut the Paleozoic rocks and the igneous schists. A small basic dyke, highly altered but originally a gabbro, cuts the limestones and igneous schists on lot 20, Range III, of Weedon township, but, on the whole, these basic intrusives are of little importance in the district. The important intrusive is the granite mass locally termed the "Block". It is about 15 square miles in extent in Stratford, Weedon, Lingwick and Winslow townships. Its contact runs about north-south about 700 feet east of the Weedon shaft and, as has been shown by underground work, dips steeply west, cutting off the igneous schists. To the southeast it cuts Paleozoic sediments. It is apparently later in age than the schistosity and most of the folding of the district. It is noted that in the mine workings an aplite dyke cuts the ore. However, this dyke may be a much later phase of the granite with an interval between long enough to permit of the formation of the Weedon deposit.

Structurally, though evidence is rather weak, the igneous schists appear to lie within the north limb of a large syncline whose axis runs north-east through Lingwick township about 6 miles south-east of Weedon Mine. In detail, a rather significant change is noted in the strike of bedding and schistosity within the igneous schists; south-west of Salmon river the strike is consistently north-east, while north-east of the river, and notably in the vicinity of Weedon Mine, the direction of strike swings sharply close to north. This change in structural trend may have been of importance in localizing the Weedon orebody and possibly, also, in localizing the granite intrusive. To what extent the granite may have been effective in changing this strike is not known.

GEOLOGY OF WEEDON MINE AND IMMEDIATE VICINITY

For the convenience of reference, it is to be noted that the three shafts of Weedon Mine lie just south of the north boundary of Range II, Weedon township, in lots 22A, B and C. The interesting area north of Weedon Mine is delineated by the south boundary of a limestone band about 2200 feet north-west of the shafts. Between this limestone and the mine the number of observed outcrops is small and most of them consist of sericite schist. On lot 24,

about 1900 feet north-west of Range II/III, there is a single band of chlorite schist about 200 feet wide interbedded with some sericite schist. This band probably projects through beneath the drift in the area just mentioned where a few outcrops were observed. North of the shaft on the boundary between 22A and 22B of Range III another band of chlorite schist appears about of the same width. On its south contact, it is thought that the so-called footwall vein, developed underground, occurs. Immediately north of the shafts is a band of sericite schist about 70 feet wide. At the shaft, and apparently forming the footwall of the orebody, is a band of chlorite schist about 20 feet wide. To the south, sericite schists again occur with, at irregular intervals, fairly highly chloritized patches. In a south-east direction from the shaft, the granite contact is located at a distance of about 1000 feet. On lots 21A, B and C a band of chlorite schist occurs approximately 600 feet in width, south of which is sericite schist. Between this contact and the granite mass as far south as Trout lake all the outcrops observed are, similarly, sericite schist. Within the sericite schist at its contact with the chlorite schist there occurs a strong development along the strike of an injected phase of the schist. Superficially, it resembles a conglomerate with round blobs of granite similar in composition to the main granite mass imbedded within the cshist.

With the outcrops available, some difficulty is experienced in joining up definite bands of chlorite schist or sericite schist. It is quite probable that many of these bands are lenticular in shape and pinch out at either end. This definitely appears to be the case with the chlorite schist band that forms the footwall of the Weedon orebody. Examination of the large scale map shows that it occurs just horth of the road at a point near the Master Mechanic's house but, to the south-west on the same strike where the next outcrop is observed at a distance of about 150 feet, the rock occurring is not chloride schist but sericite schist so that the chlorite schist probably lenses out about where it touches the road. This feature will be discussed where the possibilities of the orebody are treated. Another feature worthy of mention is the occurrence of what is called the jasper vein. This outcrops intermittently on lots 21A, B and C and again near the road where the

chlorite lenses ends. Another small outcrop of jasper occurs some 4600 feet south-west of lot 21 but it is not known that the vein follows through continuously to this point. The vein thus seems later than the schists since it occurs within the chlorite schist on lot 21 and in sericite schist on the Weedon Mine property. Numerous former workmen reported its occurrence in the mine but differed as to whether it formed the hanging wall or the footwall of the ore. A similar vein is reported in connection with some of the pyrite deposits in Stratford. This vein appears to consist mostly of quartz in which are finely disseminated small grains of specular hematite. The origin of the solutions forming the vein is to be ascribed to the granite mass.

Impressed by the apparent connection between the jasper vein and the Weedon orebody, L'agasse and Dion, two prospectors who formerly worked at the mine, have spent considerable time tracing out this vein and have latterly sunk a prospect pit on it. There is no apparent reason why this vein should either constitute an orebody or even be a favourable indication. Its occurrence in the mine may be entirely fortuitous as it cuts across all the formations without reference to composition.

Bancroft, in his report of 1915, notes that, in a considerable number of instances, work has been done without success on similar occurrence in the hope that they might prove of value at depth. He notes that, in places, a dew particles of chalcopyrite and a little pyrite occur in the jasper.

In the vicinity of Weedon, it seems unlikely that work on these veins will be profitable and it is recommended that no expenditures be made on their exploration.

Another rock occurrence which is considered important lies at either end of the Weedon orebody but has its most prominent development at the north-east end. At the south end only a few small areas were observed. At the north end where it is best exposed, it shows little or no schisting in which it stands out prominently against the chlorite and sericite schists. It is a dense rock, grey in color, to be termed rhyolite and, presumably a later intrusive. It is reported by Mr. Cushman that the north end

of the orebody feathered out rapidly. He does not mention, and possibly did not observe, the nature of the rock in which this feathering occurs. From the outcropping of the rhyolite, it is a valid assumption that the north end of the orebody feathers out underground in this rock. It is a corollary that in this same rock occurs at the south end of the orebody a similar feathering may be expected where the ore enters it. The reason for the failure of replacement to follow under this rock is probably to be sought in its lack of alteration as, from a struty of a number of districts, it seems that replacement by chalcopyrite occurs most intensely in rocks which have been highly altered.

On lot 20 in Range III is an outcrop of an intrusion dyke about 300 feet wide striking slightly east of north. It is now highly altered but was originally to be classed as a gabbro. Where it cuts the limestones, it has highly altered them to a dense, black rock. It is not considered to have any economic significance.

To the south-west of the road on lot 19 are a number of outcrops of chlorite and sericite schists and some coarse intrusive similar to that which occurs on lot 20. No detailed work has yet been done on this section but it is proposed, at a later date, to survey it magnetically.

MAGNETIC SURVEYS

Magnetic surveys, which have been carried out by Mr. Eric Holt, were decided on as the result of observation that ore specimens found in the mine office contained small amounts of magnetite and of reports that small amounts of pyrrhotite occur with the other sulphides in the mine. A few preliminary readings over the site of the old orebody gave sufficiently high readings to be significant. A hasty reconnaissance dip needle survey was then made and, later, areas where significant readings were had were covered in greater detail.

One section was located south-east of the mine along a contact with chlorite schists on the footwall and sericite schists on the hanging wall and, as geological conditions were about identical with those in the mine, magnetic surveys were carried out

in considerable detail and the results checked by use of a better and more sensitive dip needle. In this work, the needle was consistently held in a plane at right angles to the formational strike. Five such areas were located over a length of about 2200 feet of contact.

The accompanying sketch map shows the location of the several indications. Diagrams showing the patterns of the iso-magnetic contours are also appended.

The interpretation made of these is the conventional one; the high points positive and negative on either side of the neutral line being considered as the magnetic poles of the attracting body and the straight line joining them as the trace of the axial plane on surface. It cannot be assured that the magnetic axis corresponds very closely with the axis of mass of the attracting body, but in planning diamond drill holes, the drill will be pointed to intersect the plane midway between the poles.

On the area in lot 23, Range III, where the band of chloride schist occurs within the sericite schist, fairly high magnetic dips were obtained with an imperfect dip-needle. It is proposed to restudy this area in detail with a better instrument and, if encouraging readings are obtained, it is recommended to explore this section by drilling. It is known that years ago drill holes were put down in this area and the collars are still visible, but the holes were located without regard to the most probable manner of ore occurrence and may well have yielded no information.

On another area near the mine office, the area first prospected by Mr. McDonald, high readings were obtained with a dip-needle. It is proposed, likewise, to restudy this section and, possibly, also to drill it, though pyrite low in copper content is more likely to be encountered than copper ore. It may, however, be a profitable source of sulphides, if favourable terms for the disposal of sulphur can be made.

It is proposed, also to carry out dip-needle surveys along all contacts between sericite and chlorite schist bands between Weedon Mine and Salmon river. Steps are now being taken to secure cheap options on the mineral rights of all lots in Ranve II between the mine and the river previous to performing dip-needle surveys.

DESCRIPTION OF ROCK TYPES ON PROPERTY

Of all the rocks on the property, the most usual types are the sericite and chlorite schists. There are many phases of sericite schists, but there is, in general, similarity among these phases. The most altered extreme is made up almost completely of a silvery sericite but all gradations exist between this type and a quartz porphyry which is only very slightly schisted and whose quartz and feldspar phenocrysts still remain. A chemical analysis made of one of the less schistose phases by the Geological Survey shows them to be similar to granite in composition. The best opinion is that all these sericite schists have been derived from the alterations of rhyolite or quartz porphyries.

Mineralogical alteration occurs locally. Places are observed where these acid schists are converted almost entirely into carbonate which shows a rusty weathering surface. In other places, a sufficient amount of chlorite has been developed to make it difficult to distinguish these acid schists from the less altered basic schists.

The basic schistose rocks have been discussed in many old reports and various theories are postulated as to their origin. Bancroft leans to the opinion that they are altered intrusive while Dresser believes that at least a large proportion of them are altered lavas. In the detailed study of the Weedon district, in several places pillow structures were noted and on this ground the writer is inclinee to believe with Dresser that probably at least a large part of these basic schists have been derived from the alteration of lavas. What the original composition of the lavas was in hard to say as rocks of equal basicity have been developed from the alteration of very acid rocks in the northern precambrian areas.

These basic rocks show as many different phases as do the acid schists. Some of them may be described simply as igneous rocks of intermediate to basic composition in which there has been developed a moderate amount of chlorite. The other extreme is a rock almost completely composed of chlorite and there are countless stages in between these two extremes. The schists around Weedon mine in which considerable chlorite is present, appear as finely banded

rocks with bands of chlorite up to 1/10th of an inch in thickness separated by bands of less chloritized material. Locally, the chlorite in these banded schists may make up a proportion of 60% of the volume of the rock but, generally , the amount is less.

It is inferred that the Weedon orebody has been localized in an area where the rocks are highly chloritized but this relation cannot be determined until the mine has been dewatered and examined.

GRANITE

The major part of the granite mass along to the east of Weedon Mine is a normal quartz-rich biotite granite. At the extreme edge of the mass near the mine pegnatitic facies have been developed. Further south in the mass near its contact at the south end of Trout Lake, a basic dioritic contact phase occurs but by far the larger part of the mass is of the normal type.

The west contact of the granite dips to the west at a steep angle estimated to be about 70° and it intersects the schists in the mine at the 8th level and below. It is noted in Bancroft's report that a small dyke of aplite cutting the ore in the lower levels indicates that the ore is older than the granite. It is, however, quite possible that this aplite is sufficiently older than the granite to permit of the formation of the ore body between the intrusive of the granite and the aplite.

STRUCTURAL INFORMATION

It has been noted that the strike of the schists south-east of the property changes as the schists approach the granite and turns more nearly normal, giving somewhat the effect of a drag-fold located opposite an embyment in the granite contact. It may be of significance that a similar embayment in the granite contact occurs at the intersection of the granite contact over which promising magnetic indications were obtained. There is further noted a marked change in strike near the north-east end of the Weedon orebody where strikes occur in a north-west direction. The complete significance of this folding has not been determined.

Another structural feature is the truncation of the planes of schistosity by the granite contact. It has been observed elsewhere that mineralization is more liable to occur in schists where an intrusive rock outs across the schistosity planes than where the intrusive rock parallels these planes. It is a matter of common observation that in truncating these planes, the granite is provided with a larger number of channels for solution than would be the case if it were intruded parallel to the schist planes by which the ore solutions are prevented from entering into the rock.

THE OREBODY

Information as to the extent and grade of the orebody is derived from reports by J.A. Bancroft, who made the official examination of the property, and by C.W. Cushman, engineer in charge at the property at the time it was closed down. The information given here is compiled from both sources.

General Description of Orebody According to J.A. Bancroft.

The orebody has a length of somewhat more than 570 feet and a maximum width of about 50 feet consisting of cupriferous pyrite. The schists enclosing the ore strike N 35° E with an average dip of about 45° to the southeast; rolls in the dip vary from 20° to 60°. The ore is granular pyrite with chalcopyrite, some pyrrhotite, zincblende and some galena. Chalcopyrite, the latest mineral, in many places form narrow bands and streaks, but also occurs as irregular disseminations within the ore. (Some magnetite was seen in ore specimens found in the mine office.)

In general, the copper content is higher near the footwall where, in places, it has risen from 8% to 20%. Locally, some of the ore near the hanging wall is higher in copper. The average content from the south-west section is lower than in other sections of the mine. Toward wither end the orebody gradually narrows and then terminated in a slightly less schistose phase of the quartz porphyry.

The main orebody has been formed by the replacement of the sericite schists. The narrow tongues of ore that at either end of the orebody penetrate the less schistose phase of the quartz porphyry have been produced by replacement along very narrow shear planes.

Though ore from veins 2 and 3 (that is, the veins in the footwall) has not been examined, it is probable that these have replaced more schistose bands in chlorite schist.

Apparently the orebodies were developed either after or during the close of the period during which the rocks were rendered schistose. The schists are dipping toward the granite which truncates their schistosity. This suggests that the granite invaded the district after schistosity was developed.

NOTE:- Bancroft, from the evidence of aplite dyke cutting the ore, concludes that the ore is older than the granite. It is quite possible, however, that the aplite is considerably later than the granite and that the ore has come in between the two.

Description of Orebody According to C.W. Cushman

Cushman's information on the orebody is slightly different. He gives the length of the body as 480 feet with atrue width of 45 feet. He gives its strike as 15° W, which is probably a typographical error and meaning N 15° E, the dip being given as 60° east. He notes that at the north end the ore wedges out but to the south the width continues but with gradually decreasing copper content into a disseminated ore. The width decreases in depth at the south end. The chlorite schist forms a definite footwall, but values persist in decreasing amount into the hanging wall.

General Information on the Orebody

From the point of view of possibilities of the deposit, information as to the nature of the several extremities of the orebody is of interest and the following has been collected from various sections of Mr. Cushman's report. The general idea of the north end of the orebody in the upper levels is that it feathers out into small stringers in the less schistose rock though, as to grade, the north part of the body is the best ore. This is in line with the writer's opinion that no development should be carried in this direction. Cushman's map shows that the granite comes in at the north end of the 8th level, cutting off schists and ore. Near the bottom of the No.3 shaft, the granite forms the hanging wall of the ore, or at least is parrallel to the ore. This condition persists below the 10th level. Some small ore bodies occur in this area where the contact is parallel and the drift on level 13 was extended

northward in the hope of finding new bodies but without much success. One body estimated to contain between 1,000 and 2,000 tons occurs in the shaft. Drilling below the 13th level in this area gave low results, but drilling here was down the dip and may have followed a steak either richer or poorer than average grade. A composite of four holes shows results as follows:-

0'	-	60'	-	1.58% cu
60'	-	80'	-	.99% cu
80'	-	221'	-	.43% cu

This drilling, if done at right angles to the dip, would have yielded much more information. It is still a possibility that considerable 2% ore might be developed in this section and it is worthy of a small amount of drilling when the mine is dewatered.

The extreme depth of development on level 14 showed no ore on the contact and the granite cut off the schists just south of the shaft on this level. Mr.Cushman, however, considers that there is still a possibility of locating ore on or near the contact.

Mr. Cushman notes also that the low grade ore on the 13th level differed from the low grade above. The low grade ore above was disseminated in the main section of the body while below and to the south it consists of bands of rock and sulphide. Again, whereas much of the disseminated ore bove was of low copper content, the banded ore below is reported to carry 1½% to 3% copper. He questions as to whether or not this condition will continue to depth.

It is stated in the report that number 4 drift extended southward beyond the lense and, according to Mr. Cushman's recollection, ended in chlorite schists. It may be mentioned as a possibility that the drift has worked away from the contact. It is suggested that a crosscut be run from this drift in the direction of the content.

General Discussion of Orebody

Kinds of Ore

Details of quantity and grade of various kinds of ore will not be available until the mine has been dewatered and examined. Two types may be extracted:-

1. Solid or nearly solid sulphide ore with a copper content varying from 2% to somewhat more than 4%, from which heavy pyrite content will be derived in addition.

2. Disseminated ore of copper content approximating 2% but of unknown pyrite content, probably low.

If the sale of sulphur ore reaches important proportions, there may be recoverable also considerable amounts of heavy pyrite from a section east of the main orebody.

Rake of Orebody and its Effect on ore Possibilities

Surface examination gave no clue as to the direction of rake of the orebody, but examination of the plan of the underground workings suggests a rake to the south-west. One possibility on this assumption is the testing of the southern extension of the orebody between levels 4 and 13. It is a possibility to be determined by drilling that the extension of the deposit will extend southward and to some distance below present lowest levels.

The rake may explain the apparently low grade at the south end of the upper workings and the improvement below mentioned in Cushman's report.

Footwall Orebody

Somewhat less than 100 feet back of the footwall of the main vein is the so-called footwall vein. It has been cut on the 2nd, 4th and 13th levels. According to Mr.Cushman's recollection, it has a copper content of about 2.5% and varies in width from 3 feet down to one foot.

It is noted that a cross-cut on level 13 intersected this body and showed it to be three feet wide with a copper content of a little more than 2% copper.

The width and content of the vein as at present known do not seem to warrant underground operations to develop it. There is a possibility that it may attain greater widths, so that if any development work is undertaken on the property, it may pay to explore it by diamond drilling below present workings.

Under recommendations, Mr. Cushman discusses the advisibility of determining the limits of this vein.

ORE RESERVES

MR. Cushman's estimates of recoverable ore still in the mine are as follows:-

3% or better Copper ore with 40% Sulphur	47,500 tons
Milling Ore 2% Copper and 35% Sulphur	20,000 tons
Disseminated Ore 2% Copper	80,000 tons
Disseminated Ore 1½% Copper	50,000 tons

These figures may be revised upwards for the following reasons:-

1. Shaft pillars are not calculated and the grade of these will be probably run between 4.5% to 5% copper and 40% Sulphur from evidence of what old assay could be found.

2. Other level pillars containing much ore are not computed.

3. No account has been taken of the 2% ore still to be removed from the "hangingwalls" of the old stopes.

4. No ore below level 13 is computed.

A rough estimate of the pillars of No.2 and No.3 shafts indicates in excess of 60,000 tons that should average above 4% Copper. Rough approximations of all grades may be made up to about 500,000 tons, above 1½% Copper, with an amount in excess of 100,000 tons between 3% and 5%.

MARKETING OF ORE

Appended is a copy of a tentative contract for purchase of Sulphur and Copper concentrate submitted by C. Tennant, Sons and Company of New York City.

Letter Head

of

C.Tennant, Sons & Co.,

New York.

C O P Y

February 5, 1930.

Mr. Fred Connel,
Present.

Dear Mr. Connell:-

Referring to our conversation of yesterday, we confirm that we would be glad to buy such copper concentrates as are produced from a 150 ton per day mill at the Weedon Mine. We understand that the tonnage would be approximately 400 tons of 20% concentrates per month, beginning about the middle of this year and carrying on at this rate through 1933. Provided the concentrates contain no impurities we would pay for the copper content less 1.3 units at the average price of electrolytic copper wire bars f.o.b. New York Refinery, as quoted by the Engineering & Mining Journal.

We would pay for 95% of the silver over 1/2 oz. at the Handy & Harman average price and for the gold we would pay $20.00 per oz. over .03 oz. per ton. Payment would be 90 days after arrival at the refinery. In calculating the return to you f.o.b. mine you would, of course, have to deduct the freight from the mine to the refinery.

In making payment we would deduct a smelting charge of $3 per ton of 2,000 pounds net dry weight, provided the concentrates run 20% or over. If they run under 20% the smelting charge would be slightly higher. We would also deduct a refinery charge of 2-¼¢ per lb of copper accounted for.

We understand you would also make about 1500 tons a month of pyrites running 50% sulphur and 40% iron. As explained to you, a lot of work would have to be done before we would be able to make a satisfactory bid on this material as much would depend upon the rate of freight to some point where we could find a buyer. We assume that the return to you at the mine would be somewhere between 5¢ and 8¢ per long ton unit of sulphur only,

the iron to become the property of the buyers. It would be necessary to guarantee 50% minimum sulphur and 2% maximum moisture, and the material to be free from fluorine, and with a very small amount of, if any, copper.

Perhaps these rough figures on probable prices obtainable for the copper concentrates and pyrite would be sufficient for your present purposes, and when you know more nearly the analysis and quantity of the materials which you will make, we shall be very pleased to make you a more definite bid.

Hoping to hear from you again in regard to the matter,

Yours very truly,

C.TENNANT SONS & CO. OF N.Y.

Sg'd) "Henry B. Van Sindereu"

Vice - President.

HBVS:MM.

Figures are given showing returns from concentrates, based on these figures. For the purpose of estimate, gold and silver values are taken from average of Weedon shipments over a period of years.

Returns, based on Tennant terms

High Grade Ore 5-1 Concentrates of 4% Cu Ore

GROSS VALUE

Cu 20% = 400 lbs. at 18¢		$72.00	
Au 0.05 oz. at	$20.67	1.03	
Ag 2.3 oz. at	43¢	.99	$74.02

CREDIT ON SMELTER SETTLEMENT

Cu 400-26 lbs. at (374 at 15⅝)	18-2¼¢	$58.90	
Au .05 oz. at	$20.00	1.00	
Ag 2.3 oz. at	.43	.99	
		$60.89	

DEBIT

Treatment Charge	$3.00		
Silver Deduction	.05	3.05	
Proceeds from Smelting		$57.84	57.84
Actual Treatment Charge			$16.18
Freight to Smelter (estimated $3 - $5)			3.00
Total, treatment and freight			$19.18
Value of Concentrates at Weedon			$54.84

-- -- -- -- -- --

5 tons of 4% ore yield without losses:-

1 ton 20% Cu concentrate	$54.84
4 tons 50% pyr. "	8.80
	$63.64

one ton high grade or at Weedon $\frac{63.64}{5}$ = $12.75

or with pyrite concentrates at 8¢ per long ton unit $13.76, without counting losses. Recovery probably 90%.

Returns Based on Tennant Terms

10-1 Concentrates of 2% Cu Ore, 35% S
(applying to minimum of 20,000 tons -- Cushman's figures)

GROSS VALUE

Cu 20% = 400 lbs. at 18¢	$72.00	
Au 0.1 oz. at $20.67 per oz.	2.06	
Ag 4.6 oz. at .43 per oz.	1.98	$76.04

CREDIT ON SMELTER SETTLEMENT

Cu 400-26 lbs. at 18-2¼¢ (37⅝ lbs. at 15¾)	$58.90	
Au 0.1 oz. at $20.00 per oz.	2.00	
Ag 4.6 oz. at .43 per oz.	1.98	
	$62.88	

DEBIT

Treatment Charge	$3.00		
Silver Deduction	.10	3.10	
Proceeds from Smelting		$59.78	59.78
Actual Treatment Charge			$16.26
Freight to Smelter (estimated $3 - $5)			3.00
Total, Treatment and Freight			$19.26
Value of Concentrates at Weedon			$56.78

-- -- -- -- -- -- -- -- --

10 tons of ore yield:

1 ton Cu concentrate	$56.78
7 tons 50% S " (av. $2.50)	17.50
	$74.28
1 ton of ore is worth at Weedon, without loss	$ 7.43

SHIPPING COSTS

Ore was at first hauled by horse from the mine to the railroad at a cost of 80 cents per ton. In 1912 a Bleichert aerial tram was built at a cost of $1.75 per foot, reducing haulage to 6.7¢ per ton.

MINING COSTS

Mr. Cushman states that per ton costs of production including loading on cars were as follows:

1912 - $3.46

1915 - 1.73

1918 - 4.05

1920 - 11.13 (covering large development programme).

The above statement of costs is probably of little or no value in estimating costs of a salvage operation or of one for development and recovery of the low grade ore still on the property.