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"Notes on the Sooke Peninsula Copper Deposits "  
prepared from field observations made at Sooke between  
May 18<sup>th</sup> and June 1<sup>st</sup> 1948. These have been prepared to ac-  
company the following maps which have already been sub-  
mitted.

<u>Map No.</u>	<u>Description</u>	<u>Scale</u>
1	Reference map to mineralized zones.	1" - 1000'
2	Geological plan of workings on Willow Grouse M.C.	1" - 100'
3	Geological plan of showings on Copper King M.C.	1" - 100'
4	Geological plan of underground workings on Copper King M.C.	1" - 20'
5	Geological plan of the Merryth Zone.	1" - 60'

## Notes on the Sooke Peninsula

### Copper Deposits

by J. T. Fyles.

The copper deposits of the Sooke Peninsula occur in the East Sooke intrusive described by H.C. Cooke in Memoir 96 of the Geological Survey of Canada. He states that 80 to 90 per cent. of the surface of the intrusive is composed of olivine gabbro and this occupies the central part of the peninsula. Augite gabbro, which lacks the olivine, outcrops around the edges of the intrusive and small bodies of olivine anorthosite occur principally near its center. The augite gabbro and anorthosite are thought to be younger than the olivine gabbro but the age relations of the rock types and their relation to the mineralized zones is not obvious in the field. The East Sooke intrusive is tertiary in age.

Mineralization consists of a widespread alteration to hornblende along zones of shearing some of which are over 100 feet wide and half a mile long. Within these zones the rocks have been changed to hornblendite and in places veins of very coarse hornblende occur. Disseminated chalcopyrite occurs at intervals throughout the hornblendite, and massive chalcopyrite has been found associated with the coarse grained hornblende. Coarse hornblende and relatively high concentrations of chalcopyrite seem to occur at points where minor faults intersect the main shear zones.

*If based on Cooke's work  
be phrased so that fact  
is brought out clearly*

At least five of these mineralized zones have been <sup>explored</sup> developed by adits, shafts, or open cuts and ore has been shipped from at least two of them. <sup>on which these mineralized zones occur</sup> The properties were originally named the Willow Grouse, Copper King and Margaret, Old Copper Mine, and Iron Mine Hill but ~~have~~ recently <sup>the principal zones have</sup> been re-named the Cooke, Huestis, Griffith, and Merryth Zones, respectively. The fifth zone lies within the King George mineral claim.

Detailed Descriptions

Cooke Zone.

The principal showings on the Cooke Zone lie within the Willow Grouse and <sup>Bird</sup> Bluebird mineral claims. (The location of the claims is shown on Map No.1 and the geology near the workings on Map No.2. (See Map No. 2))

The mineralization occurs in what appears to be a major shear zone <sup>which</sup> striking, near the workings, <sup>strikes</sup> at about N 50° E. It can be traced <sup>more than</sup> (for over) 2,000 feet and shows on the surface as a number of subparallel ~~small~~ cliffs or scarps, 2 to 10 feet high, and as much as 100 feet long. (~~Hornblende occurs in places throughout the shear zone but is most abundant near the main workings. Disseminated chalcopyrite can also be found in the shear zone but only in the workings does it show in significant amounts.~~) The zone has been explored over a length of about 1,000 feet by an adit, <sup>a</sup> one shaft, and several open cuts and trenches.

Blue Bird

About 100 feet north of the Willow Grouse-Bluebird claim line, a shaft and one large open cut have been made. About 275 feet at N 65° E from the shaft, is the portal of an adit. The adit is caved and the shaft is full of water but the mineralized zone is well exposed in the open cut. This shows several parallel faults striking about N 15° E and dipping vertically or steeply to the north-west. Grooves on the fault surfaces show that the movement has been nearly horizontal. Coarsely crystalline hornblende is present near the faults and finer hornblende occurs farther away. The coarse hornblende has grown with the length of the crystals about at right angles to the fault planes and has itself been sheared. Chalcopyrite, occurring mainly as minute veinlets, but in places in lenses as much as two inches wide and one foot long, cuts the hornblende where it has been sheared. Blebs or nodules of chalcopyrite are also present. Most of the chalcopyrite seems to have been removed from the open cut as only a few odd stringers and small amounts of disseminated chalcopyrite appear in the walls. The hornblende grades into unaltered gabbro 15 to 20 feet from the north-west end of the open cut, showing that the mineralized zone extends little beyond the limits of the workings. A chip sample of what appeared to be

the highest grade material, from the south end of the open cut, assayed: 0.75 per cent. copper; 0.1 oz. per ton silver; 0.072 per cent. nickel; no gold and not more than 0.05 per cent. cobalt.

The eastern edge of the mineralized zone is covered by waste rocks and hence the size of the hornblende bearing zone is obscured. However, it is probably less than 150 feet long and 50 feet wide.

near the shaft

ranging from less than an inch to a foot of chalcopyrite in length and from a fraction of an inch to two inches in width

lenses and lenses of chalcopyrite

cross faults + mineralization

which also exposes

are exposed

north end of the

and little hornblende is present 10 feet west of the open cut

??

?

across the strike ~~is~~ or the projected strike ~~is~~?

South-west of these main workings several trenches have been made (to crosscut) the main shear zone. Only in the first trench south of the main workings was any hornblende found, and in this only minor specks of chalcopyrite can be seen. About 500 feet south-west along the shear zone from the main workings, an open cut exposes ~~medium~~ <sup>contains</sup> grained hornblende with small amounts of chalcopyrite. These minerals <sup>has</sup> developed along a vertical fault which strikes N 40° E. Although the trenches described above, which test the ground between the main workings and this last open cut, are badly filled with overburden, <sup>in the last trench</sup> all exposures of bedrock show ~~it~~ to be unaltered gabbro and indicate that the mineralized zone is not continuous between these two showings.

### Huestis Zone.

*What is shown in detail delete sentence?*  
 (The main workings on the Huestis Zone lie within the Copper King mineral claim shown on Map No. 1 and in detail on Maps No. 3 and 4.) A (large mineralized) zone at least 3,000 feet long and 100 to 200 feet wide runs through the Copper King and Margaret mineral claims, (striking about N 35° E.) This zone contains hornblendite, which may have been formed by the alteration of the gabbro, and in places <sup>contains</sup> coarse grained hornblende. It is bounded on both sides by parallel scarps, those on the north-west side being most prominent. Chalcopyrite occurs in minor amounts throughout the zone, and in two places relatively high concentrations of chalcopyrite have been developed by shafts, adits and open cuts. *(maps 3 & 4)*

*insert ref to maps*

*group of*  
 The main workings ~~are~~ <sup>is</sup> about 500 feet south of the north-west corner of the Copper King mineral claim. Two short adits and two open cuts have been driven to follow vertical faults striking about N 55° E. Grooves on the fault planes indicate that the movement on them has been nearly horizontal. Little chalcopyrite ~~shows~~ <sup>is present</sup> in the adits, and (in the open cuts above the adits) a sample of the highest grade material averaged (1) 0.83 per cent. copper; 0.01 oz. per ton gold; no silver, and not over 0.05 per cent. nickel, cobalt or molybdenum across 8 feet. Most of the chalcopyrite appears to have been mined out, and a few feet ~~from the cuts~~ <sup>either side of</sup> no chalcopyrite can be seen.

*No P* About 100 feet south-west of these workings <sup>to</sup> a trench 100 feet long, trending ~~S 30° W~~ <sup>N 30° E</sup>, has been made, and near its south end a shaft some 25 feet deep connects the trench with ~~the~~ underground workings (See Maps No. 3 and 4). Most faulting in the trench strikes N 30° E but several minor faults strike due east. ~~Near these~~ <sup>is exposed near the minor faults</sup> some chalcopyrite shows, but ~~this~~ <sup>west of</sup> does not continue more than a few feet from the trench. In the underground workings below the trench, relatively high grade <sup>clearing material</sup> chalcopyrite ~~mineralization~~ <sup>a</sup> seems to have existed along fault

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(1) Samples on the Huestis Zone are channel samples unless otherwise stated.

Where average assays are given the width or character of the face being sampled made it necessary to take more than one sample. These have been averaged according to the width of the separate samples.

planes striking N <sup>it</sup> 30° E, but most of ~~this~~ has been removed. A sample taken <sup>of</sup> from the highest grade material near this fault-zone in the underground workings assayed: 1.54 per cent. copper; 0.01 oz. per ton gold; 0.068 per cent. nickel; no silver and not more than 0.05 per cent. cobalt and molybdenum across 6 feet. A cross cut about 60 feet long has been driven north-west from this <sup>fault</sup> zone and exposes sheared hornblende but little chalcopyrite. One sample was taken 12 feet from the face. It assayed 0.31 per cent. copper; 0.01 oz. per ton gold; no silver and not more than 0.05 per cent. cobalt and molybdenum across 5 feet.

About 1,000 feet south-west along the main shear zone from this group of workings, <sup>is a second group of workings consisting of</sup> several open cuts and a shaft, now full of water, ~~have been made~~. In most of the cuts only minor chalcopyrite in hornblende <sup>is exposed</sup> shows, but near the shaft some fairly high grade chalcopyrite has been found. This seems to follow no prominent shearing but appears as a mineralized area some 20 feet square. A chip sample across 11 feet of this zone assayed 1.35 per cent. copper; 0.01 oz. per ton gold; 0.064 per cent. nickel; no silver and not more than 0.05 per cent. cobalt and a trace of molybdenum.

Between the two groups of workings a length of about 1,000 feet of the main shear zone has been tested by two or three open cuts and a shaft. In these and at a few other points minor amounts of chalcopyrite can be seen. Thus, ~~although~~ <sup>and although</sup> the main shear zone carrying hornblende is very extensive, concentrations

of chalcopryite in it are relatively small but possibly exist <sup>Other concentrations of chalcopryite</sup> at other places than those now exposed.

### Merryth Zone.

The location of the Merryth Zone at the south end of Iron Mine Hill is shown on Map No.1 and the exposures on the sea shore are shown in detail on Map No.5. <sup>The showing is</sup> It lies within the augite gabbro <sup>whereas the others are in diorite gabbro.</sup> but the significance of this fact is not obvious. The showing does not appear as a well defined mineralized zone, <sup>the Cooke or Westin zone</sup> like that on the Copper King and Margaret mineral claims, but as a <sup>irregular patches of hornblende occur on either side of the main</sup> altered zone <sup>on either side of which</sup> which may be 100 feet wide, trending up the hill from the sea shore at about N 25° E for a distance of 1,500 feet. This zone may not be continuous, as a drift covered area separates the showings on the hill from those on the sea shore.

A little work in the form of trenching and open cutting has been done near the shore and <sup>is well exposed</sup> good exposures of the mineralized zone <sup>(map 5)</sup> show on the sea cliff. Here an area of about 100 feet wide and <sup>altered</sup> possibly 200 to 300 feet long has been more or less completely changed to hornblende. It is bounded on the east and west by vertical faults striking about N 20° E and is cut by cross faults the most prominent of which strike N 60° E and N 20° W. The sea has cut chasms along the bounding faults and on the west side of the mineralized zone the chasm has been filled by stratified sands and gravels <sup>(see -)</sup> referred to on Map No.5 as a sedimentary dyke. The mineralized zone has not been com-

refer otherwise on map. is chasm filled with stratified gravel



*These increase in number & size away from the shore*

*contains*

pletely changed to hornblende, but irregular bodies of fine grained relatively unaltered gabbro <sup>are common</sup> exist near the sea shore and these become more numerous <sup>and are more numerous</sup> near the top of the cliff and away from the shore. Fine grained magnetite, pyrrhotite, pyrite and chalcopyrite occurs in the hornblende and less commonly in the unaltered gabbro. Near the center of the zone sulphides are relatively massive, but towards the edges they become disseminated <sup>occure</sup> as tiny veinlets throughout the hornblende. A band of hornblende containing magnetite occurs along the east side of the main mineralized zone. On top of the sea cliff the rocks are covered by overburden but hornblende and sulphides are <sup>less</sup> not as abundant <sup>in exposures there than</sup> there as on the sea shore; and <sup>1</sup> in a trench 300 feet from the sea shore very little sulphide could be found. (2)

Two lines of samples (2) were cut from the face of the sea cliff. <sup>lower</sup> The lowest at about ten feet above high tide mark averaged 0.83 per cent. copper over a width of 28 feet. These <sup>lower</sup> samples were taken in relatively unoxidized material from a section of the sea cliff that showed the highest grade mineralization. The upper line of samples was taken across 16 feet of heavily oxidized material, and although the oxidized material. (3)

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(2) all samples on the Merryth Zone were taken by cutting equal chips at one foot intervals across the face.

was removed as far as possible before sampling these samples may not be truly representative. They averaged 0.31 per cent. copper. A grab sample (No. 841K) of the highest grade material (across 20 feet) in a trench on top of the mineralized zone *see cliff dit 300' from the shore* assayed: 0.28 per cent. copper. It seems apparent therefore, from these assays and from field observations that the grade of the mineralization decreases upward and away from the sea shore. (1)

West of the main zone and to a lesser extent east of the main zone, *are irregular masses hornblende* areas of hornblende mineralization containing some sulphides occur. These seem to have formed *along* on the cross faults especially where they intersect each other. One sample taken across 8 feet *at such an intersection* assayed 0.25 per cent. copper. (2)

The showings on the hill some 1,500 feet north-east of the sea shore were not studied in detail. Several cuts and a short adit expose widespread hornblende with abundant magnetite but only small amounts of chalcopyrite, pyrite and pyrrhotite. The zone appears to end 1,400 feet north of the south-east corner post of Lot 78 at what appears to be a fault striking N 80° E. Griffith Zone.

The Griffith Zone or Old Copper Mine is a poorly exposed showing on the south shore of Sooke Peninsula. *(map 1)* Its location is shown on Map No. 1. One shaft, full of water, and a small

*(In 1948 the owners measured the depth of the water-filled shaft as 102 feet. Fifteen or twenty feet north of high tide line a shaft, now full of water but reported to be 102 feet deep has been sunk on the beach*

on either side of the shaft in a waste dump containing chalcopyrite and highly oxidized material, probably hornblende. Rocks on the shore contain hornblende and minor chalcopyrite.

~~dump exists on the beach.~~ The dump contains some fairly high grade chalcopyrite and the rocks near the shaft contain hornblende and minor amounts of chalcopyrite. Small faults striking north and N 20° E <sup>— can be seen</sup> show on the sea shore, but away from the shore there are no exposures of bedrock.

### King George.

Two large open cuts and several smaller ones on the King George mineral claim (see Map No.1) have been made in what Cooke describes as a "poorly defined shear zone about 100 feet wide striking nearly east and west". No definite shear zone is apparent near the workings but an area of hornblende perhaps 70 to 80 feet wide and 200 feet long is exposed. Faults in the open cuts strike N 30° to 40° W. The chalcopyrite appears to have been removed as very little <sup>could be found</sup> shows in the walls <sup>exposed areas</sup> of the larger cut. One small cut, however, shows an area of high grade chalcopyrite perhaps 3 feet wide and 6 feet long which grades off on all sides into barren hornblende. <sup>ite</sup> A sample across 5 feet of the highest grade material assayed : 7.95 per cent. copper, 0.06 oz. per ton gold; 0.3 oz. per ton silver; and not more than 0.05 per cent. nickel, cobalt or molybdenum.

omit 15

Conclusions

(1) Of the Sooke Peninsula Copper deposits the Merryth and Huestis zones are of the most economic interest.

(2) It is the opinion of the writer that bodies of mineralized material may exist on the Merryth Zone which are large enough and carry a high enough grade of copper to be of economic value.

(3) The present showings on the Huestis Zone do not indicate that ore exists. If other concentrations of chalcopyrite are discovered in the Huestis Zone they must be larger and of higher grade than those now exposed to be of economic value.

(4) The workings on the Cooke Zone are reported to have exposed high grade chalcopyrite but the showings appear to be small and the zone is not continuous.