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Tittel Report on the Celebrated Kjøli Copper Mines.				
Forfatter Collingwood Kitto, Thos.		Dato År 15.11 1894	Bedrift (Oppdragsgiver og/eller oppdragstaker) For engelsk interesseselskap	
Kommune Holtålen	Fylke Sør-Trøndelag	Bergdistrikt	1: 50 000 kartblad 17204	1: 250 000 kartblad Røros
Fagområde Geologi Malmberegning Gruvedrift Økonomi	Dokument type		Forekomster (forekomst, gruvefelt, undersøkelsesfelt) Kjøli grube	
Råstoffgruppe Malm/metall	Råstofftype Cu, Py			
Sammendrag, innholdsfartegnelse eller innholdsbeskrivelse Geolog og malmtyper gjennomgås og forfatteren sier det er en av de mest massive malmsoner han noen gang har vært borti. Derneft vises det til lokaliseringen langt fra skipningshavn og at en ved smelting mistet svovelsyren som nå er meget profitabel. regner med 2,5 mill tonn med 44% S og 3,5 - 4 % Cu. Gruvedrift anbefales og det forutsees god fortjeneste.				

Report by Thos. Collingwood Kitto

Esq^{re}, M. E. late specially appointed Mining Engineer and Geologist to the Cape, Griqualand West and late Anglo — Transvaal Governments.

Lulworth House

Gunnersbury 15th November 1894.

Gentlemen,

I have much pleasure in handing you my report on the celebrated Kjöli Copper Mines which are situated about 90 miles south east of the Port and City of Drontheim in the side of a hill about 3200 feet above the level of sea. The mines, though discovered earlier, were most extensively worked in the latter part of the last century and became notorious on account of the profits realised by the families who worked them.

The geological formation may be briefly described as a micaceous schist, which is the prevailing rock of the neighbourhood.

The lode, which traverses the property in a northerly and southerly direction, dips west at an angle of about 15° and is unquestionably one of the most solid and compact lodes that it has ever been my privilege to inspect. The lode where it is exposed in the ends of the excavations is over twelve feet broad of solid ore and will yield fifty Tons of marketable ore to the fathom.

To find such a large body of ore lying exposed and unwrought may naturally excite surprise in others as it did in me at first, but when the facts are fully known it will not be so surprising after all. In the first place the mines being situated at least 90 miles from the Port without railway or canal the cost of transport must have been enormous and consequently the owners were compelled to confine their operations to the very high grade ore which appears to be found in large pipes running down into the middle of the main lode. In the next place the copper had to be extracted from the ore by smelting and the sulphuric acid now so largely and profitably manufactured from copper pyrites was lost. I could refer to many minor reasons, but the above are ample.

The above difficulties have been removed: the railway which has been completed from Drontheim to Christiania now passes within twelve miles of the mines and it would be a comparatively easy matter to extend the railway on the the property after which a company would have no difficulty in making a large annual profit, even though they sent the ore to market in its crude state. But ore in its crude state should not be shipped unless it contains a very high per centage of copper. I advise the Company to treat the main body of the ore on the property by the wet process in the same way as a similar body of ore is treated at the Rio Tinto Mines.

The next and perhaps the most important point is the quantity of ore likely to be found, and here I cannot do better, than relate the facts as they have been laid bare. The ancients have sunk down into the lode a depth of 100 fathoms in a very high per centage ore pipe and at no part of the sinking was the lode richer or broader then where they left off, at the bottom. The work performed by them with so much labour is practically no other than a test shaft, and is very little more than ought to be done by any prudent company prior to laying out permanent works.

I wish particularly to call attention to the fact that from surface down to a depth of 100 fathoms a lode is exposed in each end of the pit or shaft, which will yield 50 tons of ore per fathom producing 44 per cent of sulphur and $3\frac{1}{4}$ per cent to 4 per cent of copper to the ton. The lode can be seen at intervals cropping out along the surface for a length of two miles (1760 fathoms), therefore assuming the lode throughout to be the same as where it is seen in the shaft the reserves would be 8,800,000 tons, and even if we reduce it to 1000 fathoms in length the reserves would still be 5,000,000 tons. But in order to allow for any variations or contractions in the lode (though it is just as likely to open as contract) I shall place it at only 500 fathoms in length or 2,500,000 tons of ore from the surface to a depth of 100 fathoms (I may point out that although the shaft is 100 fathoms down on the course of a lode it would only count about 25 fathoms vertically).

Now, I do not hesitate to say that if the mine be properly opened out, the roads properly constructed and everything conducted as it ought to be, every ton of ore, even if sold in its crude state, should leave a profit of at least ten shillings, so that 2,500,000 tons of ore would leave a profit of £ 1,250,000.

This would probably extend over a period of, say 25 Years by which time other reserves would be laid open at a lower level in ore probably of a higher grade, though this perhaps is a little speculative. Rich as the property unquestionably is for copper pyrites the above profits cannot of course be realized without the construction of the necessary machinery and plant.

The next point to which I wish to call attention is the twelve miles of railway which will form the connecting link between the government railway and the mines. As far as I know it has not been surveyed but I estimate the incline from the Reitan railway station to the mines to be about one in forty five (1 in 45). The government line is narrow gauge so that by constructing your line the same the trucks will pass from the mine to the seaport without the trouble and expence of reloading. It is not absolutely necessary to construct the line at once although I strongly recommend you to do so, because I am quite certain it will pay for itself in twelve months after it is open. I cannot say positively what the cost of constructing the twelve miles of line would be but I will undertake the job for £ 20,000.

In this report I have particularly avoided theories and have confined myself to those points which can be as easily tested and valued as an exposed bed of coal.

I have met some persons who place the value of these mines on a level with the Rio Tinto. I think this a mistake, for whatever they may prove eventually it would be a serious mistake to handicap them too heavily at the outset.

The property is most certainly a valuable one and if opened out in the manner I recommend is capable of paying about thirty five per cent (35 %) per annum on a capital of £ 150,000. I will say by way of conclusion that although in my previous reports on mines in other parts of Norway I have condemned them in the most unqualified terms, it affords me unqualified pleasure in the present instance to hand you a report on a mine that will pay good substantial dividends on a respectable capital.

I would like in the interest of mining to say that I have noticed of late that when persons who ought to know better have rashly selected mines and failure has been the natural result, they try to console themselves by saying „Mining upon all lodes is a venture“.

But I maintain that to a miner, who thoroughly knows his profession mining is no more a venture than shipping, railways, banking or any other commercial enterprise. It is true that owing to the wonderful success of many mines in different parts of the world there has at different periods been a mania for it, when many concerns have been started whether success was probable or not, hence disappointment and odium has been the natural result. But when mines are honestly selected and properly managed there is no safer investment for capital and the profits sometimes arising from mining are positively fabulous as compared to the profits arising from any other source.

I am, Gentlemen

Yours faithfully,

Thos. Collingwood Kitto.
