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GOLD AT MOUNT ARROWSMITH.  
REPORT OF PRIVATE EXPLORING EXPEDITION.

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Laid on the Table by Mr. Whyte, and ordered by the Council to be printed,  
August 26, 1863.



Hobart Town, 23rd April, 1863.

*The Committee of the MOUNT ARROWSMITH Gold Exploring Expedition.*

GENTLEMEN,

I HAVE the honor to hand you enclosed copy of my Diary,—being a record of the daily operations that were carried on during my four months sojourn at Mount Arrowsmith—towards the exploration of that field for auriferous quartz and alluvial deposits; together with the principal events that occurred during that time. But as some of the gentlemen interested in the late Expedition may not feel inclined to wade through the uninteresting details of a Diary, I subjoin below an abstract of such in the shape of a Report.

I must, however, in duty to myself, premise by stating that, after the first day's examination of the principal portions of the rocks at Mount Arrowsmith, I formed the most unfavourable opinion of the whole field as gold-producing; and during the week that Mr. Kissock remained with my party, I repeatedly requested being allowed to give an opinion, with the object—so strongly was I convinced of the non-auriferous nature of the rocks, and consequent absence of gold in the alluvial deposits—of staying further expenditure: at the same time I cannot but consider that, in the face of the then, even to me, unaccountable assay results of the different samples sent down to Sydney and elsewhere, the Committee acted wisely in insisting on the practical exploration being carried out.

The Mount Arrowsmith formation consists of mica schist and quartz, or, more properly speaking, a mass of quartzite schist; the quartz contained in it being, for the most part, interlaminated with the schist, and is further an *essential ingredient* of those schists. *There are no QUARTZ VEINS or LODES*, the pure quartz occurring as aggregations or nodules, with insignificant strings running transversely across the bearing of said rocks. Where quartz preponderates over the mica, an homogeneous quartz rock is formed, as is the consequence in a portion of the extreme north-western part of the property: it maintains, however, a slaty structure.

Huge lofty and parallel masses or caps of denuded quartzite schist, in some cases isolated and towering some hundreds of feet above grass, run (where not fallen for want of lateral support out of *situ* position) with a north-westerly bearing through the entire width of the property. These at the northern boundary dip rapidly into and under the Surprise River, and at some little distance outside the southern boundary disappear with a similar rapid dip into and under the valley of the Loddon.

The south banks of the Surprise, or north boundary of the property, contain here and there some very good straight and lofty forest timber, some of it of sufficient girth for purposes of machinery.

With a view to ascertaining the *practical* value of the above quartzite schistose formations, I selected spots at the bases of some of the most favourable-looking of these denuded caps (by "favourable-looking" I mean where the greatest aggregation of quartz appeared to be), and put cross-cuts into them. To ensure the most perfect average sample of their contents, I will proceed to describe the methods I adopted towards attaining that end; but, before doing so, must observe that there does not exist in the whole of the property one foot of ground that can in any other way be worked but by the use of powder, or rather the consequent loosening of the rock by the latter.

The borings from *every* drill-hole I had carefully saved, and these borings were, in the case of two of the rocks (Nos. 2 and 3) most rigidly amalgamated, as follows:—As soon as 10 to 15 lbs. of borings had been collected from each separate working, they were brought into Camp, and, after

taking their dry weight, mixed in one case with 20 lbs. mercury, and in the other with 16 lbs. mercury. Water was then added to each in such quantities as to form a consistency that would, on the introduction of a stick, and then withdrawing it, just drop from it. This consistency ensures, by constant stirring of the mass, a dissemination through it of countless globules of mercury, and thereby the most intimate connection of every particle of the stuff with the mercury towards the formation of amalgam. Each of these separate processes was continued, in some cases for two or three days, until a fresh supply of borings had accumulated at the different workings, when the original charge of borings was washed off from its mercury and a fresh charge of 10 to 15 lbs. added to same mercury, and so on uninterruptedly until the cessation of the quartz mining operations was ordered, when, on Messrs. Robertson and Kissock's last visit, the final charge of borings from each place was washed off from its mercury, and the latter in the usual way pressed through a chamois leather bag. In each case the residue, consisting of only a few globules remaining in the bag, was treated over a sand-bath in a porcelain dish with nitric acid, but without, however, I am sorry to say, even a trace of the precious metal being visible.

In addition to the above very severe amalgamation trial, I collected from each rock where workings had been carried on average samples of the work done; and these, after thorough calcination, were bucked up (crushed), and from 20 to 60 lbs. from each place, either amalgamated or tin-dished, the latter most frequently,—as, in the case of such small quantities being operated on, and where the probability of only traces of the precious metal are expected, I place very much more reliance on this latter process (always understood in the hands of a *skilful manipulator*, unless, indeed, in the former case, the operator is in a laboratory and surrounded with every necessary convenience and appliance); but not in any one instance had I the good fortune (I cannot help here confessing I never expected it) to discover even a trace.

I further collected samples of the arsenical iron pyrites present in small quantities in some of the rocks, and tested three separate samples for their auriferous contents, but without success.

I here append, before leaving the subject of the explorations of the quartzite schistose rocks, an account of the number of holes bored or drilled, and the consequent number of feet drilled:—

Average depth of each drill-hole .....	2 feet.
Number of holes drilled or bored .....	148 ..
Ditto feet bored .....	296 ..

The two principal cross-cuts prosecuted were driven a length of 10 feet to 2 fathoms each, with a height and width of 7 feet by 6 feet. From these latter, in addition to the average samples bucked up and treated,—

No. 2 yielded from its drill-holes .....	80 lbs. borings.
No. 3 ditto .....	87 lbs. ..

And these, as stated above, were most strictly and rigidly amalgamated.

In the alluvial workings prosecuted five holes were sunk, two of which were *bottomed* in the deep ground or old water-shed, the remaining three bottoming shallow, or on the dip of the *slate* or *bed rock*. In every instance close slabbing was required. The drift above and on the bed-rock was very heavily watered, and in the case of the last hole—which, although not actually bottomed (*that is the bed rock reached—there is no bottoming without this*) was, from the depth we had gone through the *lower drift* (or in Victoria termed wash dirt) and its nature, evidently not many feet or possibly many inches from the *bottom slate* or *bed rock*—to such an extent that on my going down the hole to ascertain the quantity of the coming water, I found that for every half bucket of stuff I sent up four buckets of water had to be bailed, and that in addition close slabbing being required, I saw, that unless we had sufficient force on the ground to keep the shaft going day and night, coupled with the entire absence of the precious metal in the wash, we should not for a considerable time make any progress. I therefore reluctantly ordered its abandonment; I say reluctantly, as had I succeeded in bottoming this hole, I could with a clear conscience have stated that *every operation* commenced at Mount Arrowsmith had been *practically* and completely carried through. My diary will speak at more length on the nature of the sinking and the strata gone through.

The greatest depth reached was 52 feet. In one of the holes, the bed rock of which was reached at 42 feet from grass, the wash-dirt or drift laying directly on the slate, was, as far as appearances went, as congenial for holding gold as almost any I had seen in Victoria; but, notwithstanding the numerous tub-trials it was submitted to, the glittering metallic colour never greeted our ardent gaze.

In sinking the five holes, 170 feet was sunk through and close slabbed, a great portion of the morning shift being taken up forking the water (or bailing the shaft.)

Two distinct channels or old water-courses—called leads in auriferous deep sinkings—were reached, distinct not only from their distance apart one from the other, but from the entirely different character of the strata gone through.

I have little more to add; in fact, it is anything but a pleasurable task penning a Report of proceedings that have terminated so diametrically opposite to anticipated hopes—for the most part, or wholly in fact, encouraged by the *most unaccountable*, and I can now state, and *unhesitatingly* I do so, *impossible* results of the *calculated* yield per ton of quartz from the samples sent down to Sydney and elsewhere for assay.

Now, without for a moment wishing to attribute direct blame either to the collector of the specimens, the hands the specimens passed through, or lastly to the assayer, I must candidly confess that unless the specimens in their transit from Mount Arrowsmith to Sydney and elsewhere got accidentally, perhaps in the absence of being properly labelled, mixed with auriferous specimens, and sent forward to the assayer as Mount Arrowsmith quartz,—I say that unless this has occurred, the Sydney yield of the samples were the result of the mercury used by Mr. Hodgson (as no assay was made by that gentleman, but bare amalgamation of the crushed specimens) having been used in some former gold experiments, and not subsequently and prior to the testing of the Mount Arrowsmith quartz retorted or assayed for gold; either this or, as I mention above, the wrong specimens have been forwarded. And I here again unhesitatingly repeat, backed not only by my own practical exploration of the field in question, but by Mr. Latta's assays of the specimens forwarded (and which were collected by myself, and formed in each separate case average samples of the rocks) to the Port Phillip and Colonial Gold Company's Works at Clunes, that the formation at Mount Arrowsmith confined to the limits of my examination is *absolutely* and entirely non-auriferous bearing.

But even supposing the Sydney and other assay yields to have been correct, the nodules or aggregations of quartz contained in the quartzite schistose formation would actually require to be *more* than solid gold to pay for their extraction; as the expense of mining huge masses of rock to get at these isolated nodules would more than cover the value of the gold.

I can now only deeply regret that from the very spirited and liberal manner in which the late expedition was equipped, and from the unbounded confidence and uniform kindness I received from its Members, that the one thing necessary—viz. gold—to bring it to a successful and profitable termination was absent.

In conclusion, allow me to bring before your notice—and I do so with a great deal of pleasure—the conduct of my head man, Frank Willis. In addition to his being a thoroughly tried miner from his childhood up, too great praise cannot be awarded him for his steady and unremitting perseverance in the supervision as foreman of the men, who entered the Mount Arrowsmith field totally ignorant of the practical duties of mining for quartz and sinking in deep and heavily watered holes; and left at the termination of their agreement capable, *under very strict surveillance*, of going through the ordinary duties of mining and sinking and slabbing in deep and wet holes.

I append on the other side copy of Mr. Latta's Report of the samples sent to him for assay.

I have the honor to be,  
Gentlemen,

Your obedient humble Servant,

ALBERT DUMARESQ,  
*Mining Engineer.*

(Copy.)

*Assay Office, Clunes, 20th March, 1863.*

AGREEABLY to your instructions, I have assayed the samples of quartz, &c. from Tasmania, and now forward you the results. I must premise, that every possible care was taken to keep out extraneous gold, new crucibles and covers were used, and all necessary precautions taken in crushing; with what results you will be able to judge from the subjoined assays. The samples were numbered consecutively from 1 to 6. Two assays were made of each sample; and in order to get the most reliable results  $\frac{1}{2}$  pound assays were taken. The assays were as under:—

No. 1. Nothing.	No. 4. The faintest trace.
No. 2. Ditto.	No. 5. Ditto.
No. 3. Ditto.	No. 6. Nothing.

They certainly are the poorest samples I ever examined, both in appearance and results.

(Signed.) G. J. LATTA.

The subject of the journey up to Mount Arrowsmith, and the return, not being strictly a matter for report, I add here that our drays succeeded not only in reaching a much more westerly point than achieved by any dray before, but were driven right on to the centre of the Mount Arrowsmith property and on to the spot selected for encampment. And here I cannot help adding that this achievement (for as such it is really looked at by those acquainted with the boggy—at all times of the year—nature of the ground, so much so as, in some cases, to require cutting dray tracks through the forest banks surrounding these swamps) is mainly attributable to the untiring energy, judgment, and perseverance of your Mr. Robertson; as, had it not been for the well-timed presence of both Messrs. Robertson and Kissock at critical junctures, when within a few miles of our destination, a great deal of valuable time would have been lost in transporting stores and tools, &c. some miles. To Mr. Kissock I am much indebted for his most able assistance in the despatch of and return expedition; and to both of the above-named gentlemen I have to offer my sincere thanks for their uniform courtesy and ready willingness to further all or any of my suggestions during their two visits to my camp.

ALBERT DUMARESQ.