

117A
Sir,

In accordance with your instructions of 6th July last I have visited the prospecting claim on the Lisle Goldfield held by The Mount Arthur Prospecting Association, and while in the district I also took the opportunity of looking at some auriferous veins on sections held by Messrs Titmus and Dodgshun. As my visit was a very hurried one, taking only the afternoon of one day and the forenoon of the next I could not attempt to go over the whole field and only saw a small part of it.

The goldfield is situated on the North-east slope of Mt. Arthur, near the head of Bessells Ravulet, and may be reached by tracks from Golconda station on the Scottsdale Railway, and from the Launceston to Scottsdale Road. The latter is very steep, there being a fall of 1000 feet from the top of the range down to the field, which is some 600 feet above sea level. In descending from the Scottsdale road sandstones probably belonging to the Lower Silurian system, often very hard and crystalline through metamorphism, are passed over, but in the valley we came upon a somewhat finegrained Granite, very much decomposed by weathering wherever I saw it. This Granite seems very similar to that found in the Golconda field some five miles further north. The Lisle workings, as far as could be seen from my hurried inspection of the locality, lie in a somewhat wide valley which contracts to a gorge lower down the creek. The bottom of the valley has been worked for some five or six hundred feet in width, from which it would appear that the auriferous material could not have been confined to one narrow lead but must have spread over some distance. Round the ~~edges~~ edges of the flatter ground, at the foot of the slopes of the surrounding hills, there are large terraces of alluvial material, some of which have been successfully worked. It seems ~~that~~ rather likely that at one time the detritus from the surrounding slopes was brought down into the first part of the valley faster than it could be discharged through the gorge at the outlet, and consequently large accumulations took place especially at the bottom of the hill slopes. In one claim I noticed traces of the former presence of still water, there being a layer of finely laminated clay and sand lying horizontally upon the bottom gravel; and in the clay were numerous ligulate impressions of leaves but all so fragmentary as not to be recognizable as ~~the~~ species. It may be that the valley was formerly a lake bed but so far I have seen no sufficient evidence to say definitely that this was really so.

The Lisle field has been a large producer of gold having yielded over 75,000 ounces. About 14 years ago the field supported a large population, but now there are only about 30 miners left on it; some of these however have been working their claim continuously for many years past.

The ground has been worked principally by ground-sluicing and also by hydraulicking, but in the latter case only with small quantities and low pressure of water. There can be no question that if these crude methods, would pay, working would be much more profitable if carried on by a proper system of hydraulicking with a good supply of water under high pressure. My examination was necessarily much too hurried to enable me to form a reliable opinion as to whether there is a sufficient amount of ground left available for hydraulic sluicing to make it worth going to the expense of bringing water in to the field at a high level, but there is certainly a very considerable quantity that seems of promising character and worthy of being tested with a view to hydraulic treatment especially in the terraces at the base of the hill slopes.

The gold from this field is very fine in grain, nuggets being quite rare, and is said to be very seldom found with quartz attached it. The wash is of a clayey nature in the terraces with not a great deal of stone through it; the stones are but little water-

worn and consist of metamorphic sandstone from the surrounding hills, chalcedony from veins in the granite, and only a little quartz that seems likely to have been derived from reefs. In parts we find runs and patches of quartz wash, but on the whole it does not seem very plentiful. In some of the claims towards the head of the Valley there is much less clay than in the terraces near the township, and faces of 6 to 15 feet in depth of coarse sandstone gravel are seen in the workings. In these the stones are more waterworn, and the wash appears to be richer in gold. According to the information given to me some of these would pay very handsomely under hydraulic treatment.

MOUNT ARTHUR D.A. The workings of this Company are situated towards the head of the valley, about quarter of a mile from the township and near Messrs Wheeler's and Marshall's claims. A deep run of alluvial ground here runs under a spur which trends westerly from the main range and lies between two small creeks. Three tunnels have at various times been driven to the north-east from the low ground near the south-west point of the spur, all lying quite close together. The No. 1 or first tunnel was made some years ago: it was driven 600 feet to N.45° E. For the first 195 feet it passed through soft weathered granite, then went through a considerable width of alluvial material containing angular quartz wash carrying gold. This tunnel was inaccessible when I visited the ~~xxx~~ spot: the soft granite runs very easily in wet weather and the tunnel being an old one is not fit to be used for working. This one having struck the wash above the bottom of the alluvial matter another tunnel, No. 2, was driven about E.N.E. some 290 feet, all through soft granite. The plan of the mine shows that the end of this tunnel is almost under a point in the No. 1 about 130 feet from the mouth, and consequently not far enough eastward to meet with the alluvial channel: this tunnel is not now used but could be made available by continuing it about 80 feet further on a course about N.E. so as to come under the point where the No. 1 tunnel cut ~~thru~~ the wash. It is some 15 feet or so lower than the No. 1 tunnel, and is the lowest of the three and probably the best ~~mine~~ one to work from in the long run. The No. 3 tunnel is rather crooked, running 245½ feet about E.N.E. then turning to the N.E. so as to run parallel with the No. 1 at a distance 15 feet N.W. from it, and at a level about 8 feet lower than it. In the approach there is some very clayey surface material containing a little gold. Soft granite is passed through for 370 feet before the old alluvial channel is met with: this seems to run about East and west, the same as the spur under which it lies. The tunnel passed through alluvial material, fairly rounded boulders and heavy gravel of metamorphic sandstone much mixed with clay and sand, for a distance of 85 feet and was then driven a further distance of 150 feet in the soft granite of the northern side of the lead. The granite bottom is stated to have been cut in the floor of the tunnel all the way along, so it would seem that the gutter of the lead must have been passed through. The depth below surface of the lead at this point is about 75 feet.

A very unusual feature is seen in this tunnel right in the middle of the alluvial channel where gold bearing gravel might have been reasonably expected to occur, and which has proved very puzzling to the Company, viz :- a wedge of the granite bottom has been thrown up into the drift by two small faults, or to speak more correctly the drift has been faulted down on each side of a block of the bedrock. The faulting planes are quite smooth and straight and in one case rather overlies the gravel, and there can be no doubt as to the nature of the occurrence. Though common in the coal-fields and in the older rocks containing mineral veins, it is very unusual to find faults in the more modern alluvial deposits though they are not by any means unknown. It is very probable that these Lisle gravels are of considerable antiquity having most likely been laid down in the Palaeogene period of the Tertiary system. In order to explain the occurrence and result of these faults it is necessary to give a rather detailed description of this portion of the workings.

For 26 feet after first striking the alluvial matter the granite bedrock dips gently in the drive from the roof down to the floor, the wash being clay, sand, and boulders with a very little

gold all through it. Then a wall of granite cutting the wash clean off was met with running northerly across the drive and with a slight underlay to the west. Against this a little good gold-bearing gravel was found, containing angular gold with occasional pieces of quartz attached to it. As this seemed to go up into the roof a rise was put up to follow it but in about six feet it cut out. From the rise a drive was put in eastward about 16 feet which cut the old No. 1 Tunnel, but the ground was so loose that this had all to be closed up with laths. In this cross-cut we see another slide run north easterly and underlying a little to the northwest: it appears to be cut off by the one first mentioned, and it is it that apparently cuts off the goldbearing gravel on which the rise was put up. The tunnel was continued on for 13 $\frac{1}{2}$ feet past the rise, passing through the granite intrusion, and then another fault nearly parallel to the first but underlying eastward was met with which once more threw down the alluvial matter to the tunnel level. Here a ~~cross~~ cut was put in to the eastward again to try to reach the old tunnel, and another one about 9 feet further ahead, but so much running ground was met with that they had to be discontinued. At the eastern edge of the alluvial ground against the wash lies against a steep face of granite and it is likely that there has been another fault. A short-crosscut has been put in here also without being able to reach the old tunnel. The manager's aim all along has been to get ~~him~~ to the auriferous quartz wash met with ~~him~~ by him years ago in the No. 1 tunnel, but the running nature of the drift has so far baffled him - The clayey wash first met with does not contain much water, but the lower auriferous drift of the old tunnel did, and whenever the old tunnel has been broken into much water has come from it. The little bit of good wash found against the first fault is probably a portion of the gold-bearing stuff said to have been found in the No. 1 tunnel and affords some guarantee that the results stated to have been obtained from this are genuine. The problem now is to get to this good wash. As the lead appears to run east and west, the bottom falling towards the west, and the main faults run north and south, it is likely that the latter could be avoided by driving eastward up the old lead. It is clear that there is not much use in opening out in this much disturbed ground, and it will be best to get away from the faults before ~~trying~~ trying again for the wash. As the ground about the old tunnel workings is also likely to be very loose it would be best to get some little distance away from these also. I should recommend the Company therefore to drive eastward from the tunnel at the rise say 40 or 50 feet, and then to rise up into the alluvial channel and ~~crosscut~~ crosscut it to find the run of auriferous gravel. It will be necessary to try to find the gutter and then follow it up the lead. It seems likely that in the present workings the granite intrusion has raised the gutter above the wash on the sides of the channel that would ordinarily lie above it: this might be tested by rising right up through the granite block, which is not likely to extend much higher than we see it.

The value of the wash in the lead is only known from hearsay evidence as to what was found in the No. 1 tunnel in former times and from the small quantity lately got beside the first fault. Now that the tunnel is open and the lead can be tested without much expense it is highly desirable that a thorough ~~trial~~ trial should be made of it, with two ends in view: first, to ascertain if the lead would pay for blocking out, secondly to see if it would be payable to work the whole spur as an open face by hydraulic sluicing. Certainly the work is at such a stage that it ought to be gone on with till the ground is thoroughly proved. It is manifest that there is here an old deep alluvial lead running into the main valley where the Lisle field has proved so richly auriferous, and there is great reason to hope that this also will be worth working. Should the work now recommended prove successful it would be best to seek for the outlet of the lead to the westward among the terraces fringing the Lisle Valley, and to work up it on the bedrock all the way, by blocking out or hydraulicking as may prove most advisable.

TITANUS TITMUS AND DOBBSHUN'S SECTIONS. These rise close to the township, near Donnelly's terrace, which formerly was one of the richest claims on the field. A set of gold-bearing veins have been discovered in the granite bedrock which may turn out to be of some importance. There are five or six of these veins lying close

together, and forming a ~~wide~~ belt three to five feet wide which contains gold. The veins consist of from $\frac{1}{4}$ to $1\frac{1}{2}$ inches in thickness of quartz, quartz and Kaolin, and Quartz and oxides of iron and manganese, running very straight over considerable distances. The belt of veins has been traced some 8 chains: course N. 76° E. dip 84° to N.W. Two small tunnels have been driven on the veins the lowest one of which would be about 50 feet below the highest cutting on the line. The veins however should run straight into the main range but have not been traced far on account of the heavy surface drift. All along the course of the ~~set~~ set of veins where they have been exposed a little gold can be got by crushing them. The soft granite in which they lie yields a little gold, but the principal value seems to be in the veins themselves which require crushing. The material is not rich, but is worth a working trial to see if it could be made to pay. It could be easily and cheaply mixed, the veins and the enclosing rock both being very soft, and could be greatly concentrated by puddling before being ~~crushed~~ crushed. In the puddling machines the soft granite with the vein stuff would be washed away setting free a little gold, which from its fineness would best be caught with the aid of mercury, and the harder and ~~richer~~ richer vein stuff would then pass readily through a battery. It would not be advisable to put the stuff as it is mined, through a battery as it is very clayey and would be likely to carry away fine gold in the sludge: besides the soft granite really requires no ~~crushing~~ crushing and would be much more cheaply dealt with by puddling. By this treatment it seems to me that there is a fair chance of working the veins at a profit, and the prospect is quite good enough to warrant working trials being made on lots of two or three tons to ascertain more exactly their ~~value~~ value. Ordinary dish tests and assays should not be relied on in a case of this sort, more extended trials being necessary. It would be an easy matter however to have a quantity of the rock reduced by puddling, and then crushed at the Golconda or other neighbouring battery. Until some such tests have been made it will be hard to say whether the mine can be made to pay, but it seems to me that there is every inducement for the owners to take this trouble to satisfy themselves.

In the lowest trench on the set of veins they are bigger and more defined than where seen higher up, and it is possible that in depth they may unite to form a more definite lode. I am afraid however that at a depth the granite country also will become very hard. It would, I think, be advisable to trace the veins into the big hill to the N.E. and if possible to follow them up to the contact of the granite and sandstone formations to see if they possibly form a more defined lode in the latter.

These veins are said by some to be the only ones yet found carrying gold on the Lisle field, but I have also been informed that similar ones were not infrequently met with in the bedrock by the alluvial diggers. It seems very possible that much of the ~~gold~~ gold in the valley has been derived from similar veins, but I am more inclined to think that the sandstone country, and particularly the belt along the contact between the granite and the sandstone will in time prove to be the source of the gold. It is ~~suggestive~~ suggestive that so much of the gold is found among sandstone gravel without much intermixture of granitic material. So far as I can learn there has not been much prospecting done on the slopes of the hills to search for reefs, and it is very probable that good auriferous veins must exist there. It is not likely that a field which has been so rich in gold as the Lisle should have ~~derived~~ derived it all from small auriferous leaders.

I have the honour to be

Sir,

Your obedient Servant

A. Montgomery M.A.,

GEOLOGICAL SURVEYOR.

The Secretary for Mines,
HOBART.

Mines Office, Launceston,
19th S^{pt}. 1894.

Since writing the above I have received the results of an assay of quartz from the veins in Titums and Dodgshun's Sections, made by the Government Analyst? The stone was clean quartz from the lowest trench on the line of the run of veins, and yielded Gold at the rate of 8 dwts. 12 grains and Silver 20 grains to the ton. Judging the prospects washed on the ground by comparison with the result obtained in a mortar test of portion of the above sample it is probable that the average value of the vein stuff is about 5 dwt to the ton, which ought to be payable if dealt with by puddling and crushing as above suggested. An extended working trial is to be recommended.

A. Montgomery
GEOLOGICAL SURVEYOR.