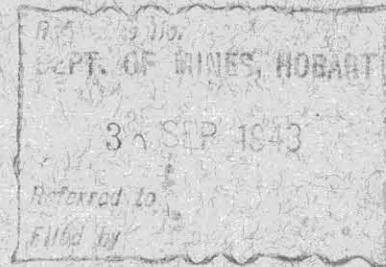


545001 Q25

NORTH BROKEN HILL LIMITED
(Incorporated in the State of Victoria)

GEOLOGICAL DEPARTMENT



QUARTZ CRYSTAL PROSPECTING

REPORT No 3

**THE GLADSTONE FIELD
TASMANIA**

BROKEN HILL

21 - 9 - 1943

000

PLEASE ADDRESS COMMUNICATIONS TO THE COMPANY

545002

NORTH BROKEN HILL LIMITED

(INCORPORATED IN THE STATE OF VICTORIA)

P. O. BOX 20 C

BROKEN HILL, N.S.W

21st September, 1943.

COPY ONLY

The General Manager,
North Broken Hill Limited,
BROKEN HILL.

Dear Sir,

Attached is my third report on Quartz Crystal Prospecting. It deals with the Gladstone and Mount Cameron district of Tasmania. It will be seen that this is an important locality and one which may be counted on to appreciably augment the Quartz Crystal supply, with little or no expenditure beyond the actual testing and purchase of the Crystal.

One of the five samples brought back for testing satisfactorily complied with the requirements and has been purchased by Amalgamated Wireless (Australasia) Limited for £7/10/-, the cheque being forwarded to Mr. Henry Groves, of Gladstone, who supplied the specimen.

Yours faithfully,

W.D. Garity
Chief Geologist

MDC/MBB

THE GLADSTONE - MT. CAMERON QUARTZCRYSTAL DISTRICT, TASMANIA.Introduction

Bulletin No.25 of the Tasmanian Geological Survey, published during World War No.1, mentions the occurrence of quartz crystal in the tin gravel of the Gladstone District. It is stated therein that much of the crystal was sold by Chinese collectors to opticians and lapidaries for about 2/- per pound. In recent years a few crystals have found their way to the laboratories of manufacturers of radio oscillators, but owing to defects only a small proportion of these have been usable. Several representatives of the radio firms, and also of the Mines Department, have visited the locality. They did not carry on any systematic purchasing, however, and seem unfortunately to have left the local people in possession of no very clear conception of what is required.

Mode of Occurrence

The quartz crystals, which are commonly up to a foot in length, and for the most part at least several inches in length, have usually a length to breadth ratio of about three to one. They are found sporadically distributed in the tin-bearing alluvium, particularly on the north-west flank of Mt. Cameron. The gravel or alluvium has been worked at intervals over an area of some square miles by the use of water nozzles and sluice boxes. The pebbles in the alluvium have been raked out of the sluice channels and are now to be found in small heaps scattered over the workings.

The quartz crystals - and the tin - originated in the numerous narrow veins to be found in the granite of Mt. Cameron, and in the nearby overlying slate. These veins are not large enough, or rich enough, to be worth mining for either tin or quartz. Furthermore, it is likely that the quartz crystals in the veins would be interlocked with feldspar, and thus very difficult to isolate, the feldspar has weathered away in the formation of the alluvium. The supply of quartz crystal must come from the old pebble heaps or "hoppering" heaps, but may possibly be augmented by a supply from any gravel being newly worked.

The abundance of the quartz varies considerably in the different workings. In practically all instances, the pebble heaps could be completely examined with the aid of a pick. None of them is more than a few feet thick, and they usually line the banks of the old sluice channels, into which they could be raked as a convenient method of sorting.

Types of Quartz Crystal Present

All the crystal found in the tin gravel is waterworn to some extent. Occasionally only the sharp crystal edges have been modified, but usually the abrasion has been more severe. Some of the pebbles are completely rounded, with no sign of crystal faces. As a rule, however, the Z (or C) axis of the crystal can be determined approximately from the elongation of the pebble.

In colour there are all variations between clear transparent crystal and the jet black opaque type. Most of the specimens are at least smoky. The number of jet black specimens greatly outweighs the number of colourless pebbles for the field as a whole, and the purchase and utilization of the black quartz must therefore be the main consideration in any operations at Gladstone.

Because of the attrition inseparable from their alluvial character, post-crystallisation flaws, as distinct from connate bubble planes and milky zones, are particularly common. The exterior surfaces of the pebbles are rough and interfere with a clear view of the quality of the interior. This has been countered on the field by the reprehensible practice of breaking the pebbles. Painting the surface of a pebble with methyl salicylate overcomes the difficulty admirably, and should be the method used in the field. Unfortunately the black quartz remains opaque even when treated in this way, and the presence of flaws can be detected only by removing the colour by heat treatment or by sawing the crystal into thin slabs. Clearing by heat is to be deprecated as a field method, owing to the risk of breakage. In the laboratory, also, the method of slicing the pebble has certain advantages over clearing it by heat.

Method of Gathering the Quartz

The pebbles may be gathered either through the enterprise of the local residents or by employing a group of paid collectors. Owing to the scattered nature of the deposits, and the knowledge of them possessed by the local people, I am convinced that the best plan is to supply the incentive for them to exploit the workings. In this way no special expenditure of manpower or money will be required.

At regular intervals a purchaser should visit the field. This man should be a radio technician who is completely familiar with the latest methods of utilising quartz crystal, so that no material usable by any present devices would be passed over. In this regard it is well to note that the black crystal which forms the bulk of the Gladstone supply, can be

used without difficulty by Amalgamated Wireless (Australasia) Limited, whereas certain other firms state that they cannot use it.

The visiting purchaser should also be equipped with all the reagents and apparatus necessary to arrive at a reliable valuation in the field. This matter has been discussed with Amalgamated Wireless (Australasia) engineers and it appears that supplies of methyl salicylate and hydrofluoric acid, with appropriate vessels, would probably suffice. The pebbles can be etched without cutting, and this is apparently reliable. If it were found that power were required for a lantern or diamond saw, the supply at the Endurance Mine near Gladstone would be available.

The last requirement - but a most important one - is that the purchaser be empowered to buy crystal at Gladstone without the formality of shipping it to the mainland. It is essential, if the workings are to yield the maximum supply of quartz, that the local people should have full confidence in the purchaser, and to this end it is desirable that as little as possible of their gatherings should be shipped away and later pronounced valueless.

Conclusion

I recommend that the important resources of the Gladstone field be exploited by local enterprise, spurred on by the payment of adequate prices by a visiting purchaser. This plan has many advantages over any system of manning the field by independent labour, especially in the matters of efficiency, supervision, and elimination of theft.

The visiting purchaser should have full power to make cash payments at Gladstone and be supported by sufficient reagents and apparatus to enable him to make a satisfactory appraisal of the material offered. Visits should be arranged at six weekly or two monthly intervals.

W D Garnett

Mining Geologist