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MINING FOR QUARTZ CRYSTALS AT KINGSGATE.

by

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- MINING FOR QUARTZ CRYSTALS AT KINGSGATE

In company with Mr. E.B. Dow a visit was paid to Kingsgate on Monday, November 9th, and a brief examination made of the pipes which were being mined for quartz crystals. These comprise -

The Giant Blow - No. 11 on Andrew's plan, p.94, Mineral Resources, Volume No. 24. The Molybdenum Industry of New South Wales.		Both worked by Radio Corporation Ltd.
Pipers Hole - No. 29? on Andrew's plan.		
The Arsenic Blow-No. 28 on Andrew's plan.		Being worked by Amalgamated Wireless of Australasia Ltd.
The Muck Pipe - No. 44? " " "		
Goodwin's Pipe -		

The Giant Blow from the surface to about 20 feet depth is a vertical cylindrical pipe 20 to 30 feet in diameter and below that depth it decreases in size and dips generally south-easterly at 30-40°, with irregular steep sections, flat floors and lateral offshoots. The pipe material is mostly massive-looking white quartz. Soft country leads to vugs with, first large white opaque crystals, and then clearer crystals of commercial grade. Some extremely large, double ended, opaque crystals have been taken out of this pipe. Little molybdenite or bismuth is present. At the time of inspection the pipe was constricted in size and sinking in hard country was in progress in the hope of locating further vugs.

The Piper's Hole pipe was full of water and an approach trench was being cleared out preparatory to beginning operations.

The Arsenic Pipe is the principal deposit worked by Amalgamated Wireless of Australasia Ltd. It is described in some detail by Andrews. The general trend is to the south-west in alternate horizontal and 45 degree sections. The best development of vugs seems to be in the horizontal sections, a feature also noticed in the Giant Blow and in other pipes. When this pipe was formerly worked for molybdenum and bismuth, a considerable portion of the hanging wall section of the pipe was not mined and it is possible that it may contain some quartz crystals. A horizontal chamber at the bottom of the pipe is giving fairly good returns at present and when this has been worked out, it is proposed, if further sinking does not appear attractive, to mine back up the pipe for as far as results may justify. This will give comparatively very low mining costs as the broken ground could then be left as filling in the pipe instead of having to be hauled up the difficult and complicated route to the surface.

The Muck Pipe is a regular small pipe which dips 50-55° in a west-south-west direction. Work was suspended at the bottom when the pipe decreased in size and appeared to make off flatly to the south. As this condition has been favourable for vug formation in other pipes it seems desirable that further work should be done here, at least sufficient to test the possibilities of this flat-lying section.

Goodwin's Pipe, also described by Andrews, was an important producer of molybdenite and bismuth. The main branches dip at low angles towards the south. It has so far been worked for quartz to a limited extent only.

The most useful indication of the presence of vugs and the desired content of clear quartz crystal observed up to date is their association with flat sections of the pioes. Crystal formation in these sections is presumably bound up with the fact that the depositing solutions acted under lesser confining pressure than elsewhere in the pipes.

The direction of the pipes themselves is related to the jointing in the granite, but so irregularly that it is practically impossible to hope to be able to foretell the behaviour of a pipe for any distance ahead. The major joint systems in the granite appear to dip at low to moderate angles in the general direction of the granite slate contact, as also do the pipes. The next important joints are usually those more or less at right angles to the first, dipping steeply away from the contact and a minor jointing is often developed at right angles to these two. The pipes follow one joint plane or another, or more usually the intersection of two, but the trend of the pipe may be influenced by local dominance of different planes or occasional disturbing irregular areas or oblique joints and fractures. In addition the swinging round of the granite-slate contact introduces a further source of variation.

The bonds in the pipes of course make extraction of ore very difficult and often the haul to the surface has to be accomplished in several stages, but this irregularity combined with the limited cross-section of the pipes and the considerable distance between pipes makes it impossible to plan a location for a main vertical shaft from which one or more of the pipes at present being worked could be operated. A detailed geological survey of the field might yield interesting information about the relation of the pipes to the joint systems in the granite and to other geological features but it is not considered that it would materially assist in the production of quartz crystals, neither does it seem that geophysical methods are particularly applicable on this field.

The present or absence of crystal does not seem to be necessarily connected with the metal content of the pipe. Obtaining more crystal is simply a matter of opening up more pipes, and the most desirable acquisition would be reliable local knowledge of the quartz and mineral content of the pipes when they were formerly open. The water problem is not difficult and once the old workings are baled out it is a fairly simple matter to keep the water under control. One suggestion for the working of the pipes is prompted by the nature of the product. The usable crystal content of the pipes is low - .8 lb per ton mined up to the present - and is necessarily selected during the mining process. Hence where the cross sectional dimension of the pipe is great enough costs should be lowered by winzing down the pipe to a reasonable working depth, determined by prevailing conditions, and then mining the remainder of the pipe upwards from the bottom, selecting the crystal and leaving the remaining material as filling, in the manner now proposed for the Arsenic pipe. In this way the difficult haulage of broken ground up the tortuous course of the pipe would be kept to a minimum.

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