

GEOLOGICAL - WESTERN AUSTRALIA.

PRELIMINARY REPORT.

The Blue Asbestos Deposits of the Hamersley Ranges.

By K. J. Finucane.

(a) Introduction:- The occurrence of blue asbestos in the Hamersley Ranges has been known for some years, but during 1937-38 reports of a steady demand for this material resulted in considerable prospecting and development work being done through the ranges in the search for, and the production of, long fibre asbestos. The three principal occurrences are in Wittenoom's, Vampire, and Dale's Gorge.

Wittenoom's Gorge is located 17 miles south-west, and Vampire Gorge 30 miles south-east of Mulga Downs station which is 180 miles south-east of Roebourne. Dale's Gorge is 9 miles east of Vampire.

The asbestos (crocidolite) occurs in the form of cross fibre in veins in flat bedded hematite-quartzites of the Nullagine series.

(b) Wittenoom's Gorge:- In Wittenoom's Gorge the asbestos fibre occurs in cliff faces at elevations of from 150 to 200 feet above the bottom of the gorge. The fibre is associated with a prominent marker bed consisting of 6 inches of quartzite overlain by 10 to 15 inches of dolomite. Below the quartzite a consistent seam of crocidolite is exposed over a length of 1400 feet. Over this distance the length of the fibre varies from a thin thread up to 2 inches. From 4.5 to 6 feet above the bottom seam - i.e. over a vertical range of 18 inches - there are several seams of asbestos in which the fibre varies from 0.1 to 1 inch. The aggregate thickness of crocidolite in the 18-inch ribbon, i.e. including all seams, varies between 2 and 3 inches. The asbestos formation also extends up a branch gorge for a distance of 1500 feet.

A second ribbon from 14 to 18 inches thick and containing several seams of asbestos occurs about 30 feet above the marker. Individual seams of fibre vary from 0.25 to 1.75 inches, and the aggregate thickness varies from 2.5 to 4.5 inches.

Production from this gorge to October 1938 was approximately 70 tons.

(c) Vampire Gorge:- The asbestos workings in Vampire Gorge extend over a total length of approximately 3 miles. Two horizons are being worked - one in the upper portion of the gorge and a second horizon from 150 to 200 feet stratigraphically above it in the lower portion of the gorge.

In the lower horizon there is a definite marker bed about 6 inches in thickness, consisting of what appears to be an amorphous form of blue asbestos. The bulk of the fibre occurs below the marker and consists of a ribbon of good quality in which the length of the fibre varies from 0.5 to 2 inches. Occasionally, thin lenses occur above the marker. Four and a half feet below the marker, there is a similar bed with which asbestos fibre is also associated. The lower horizon has been worked over a total length of 1500 feet.

The upper horizon may be traced for a distance of over 2 miles and is associated with a marker bed similar to those described above. Most of the workings show from one to two seams of fibre below this marker and two or three seams above it. Individual seams vary considerably as to the length of fibre and range from 0.25 to 1.5 inches. The aggregate thickness of crocidolite would probably average about 2 inches over 4 feet vertical height.

(d) Dale's Gorge:- Workings in Dale's Gorge extend over a total length of 1.5 miles. Two definite limestone marker beds, each from 6 to 10 inches in thickness, may be traced through the gorge. These markers are 20 feet apart and the following asbestos seams are associated with them - a top seam 10 feet above the upper limestone marker; Mahlberg's seam 15 feet below the upper limestone marker; a small seam of asbestos usually known as the "stringer" 7.5 feet below the lower limestone marker, and the main bottom seam 10 feet below the lower limestone marker.

In the upper portion of the gorge on Mahlberg's and Cotter's claims, Mahlberg's seam has been worked over a length of 1600 feet. The fibre varies in length from 0.5 to 2.5 inches. On Reid's claim, which is located half a mile below Cotter's, the main bottom seam has been worked; the length of fibre varies from 0.5 inches to 1.5 inches. Mahlberg's seam is impersistent in Reid's claim. Continuing down the gorge the fibre of the main bottom seam is short where visible in the cliff faces, and little work has been done for a length of 1200 feet.

Tyrer's workings are located towards the lower end of the gorge and extend along the main bottom seam for a length of 1200 feet. The fibre varies in length from 0.5 to 1.5 inches and would probably average 1 inch. At the end of his benches Tyrer has carried out a little work on the top seam which shows lengths of fibre varying between 1.25 and 1.5 inches.

(e) General Summary:- A total of 400 tons of asbestos was won from these gorges in a period of a little over 12 months but excess, uncontrolled production resulted in a fall in price and consequent curtailment of operations. In Wittenoom's Gorge, there is an aggregate of from 3 to 4 inches of fibre over a vertical height of 6 feet, and with reasonably good market conditions this deposit could be mined. In Dale's and Vampire Gorges a considerable amount of fibre could be won by stripping the cliff faces. Further deposits of asbestos are known to occur throughout the Hamersley Ranges.

During 1936-37, Australia imported 5486 tons of asbestos valued at £87,117. While blue asbestos has some disadvantages when compared with white, the possible uses of the Hamersley Range fibre deserve full investigation. It should be possible to supply a large proportion of Australia's requirements with asbestos from these deposits.

COPY OF REPORT ON HAMERSLEY RANGE BLUE ASBESTOS

BY

JOHN S. FOXALL, ASSISTANT STATE MINING ENGINEER.

19th July, 1938.

Hamersley Range Blue Asbestos.

On my recent visit to the Hamersley Range district accompanied by Inspector G. Matheson, I made a detailed examination of the workings in Wittenoom Gorge, a plan of which, together with Bee Gorge, is attached. The plan is made from field notes prepared by Mr. Surveyor R. G. Medcalf, who recently surveyed Mineral Claims 163^H - 168^H inclusive.

General Description.

Ascending a steep declivity Eastward from about midway along the Western boundary of M.C. 167, the ledge on which the principal workings exist was reached at a point some 150 to 200 feet vertically above the creek bed. The last 12 to 15 feet was ascended by scrambling up a cleft in the face of a vertical cliff.

This ledge is almost perfectly flat and has been cleaned down to a width varying from 3 to 20 feet. The asbestos here appears in two horizontal seams, about 4 feet apart. The bottom seam consists of a practically unbroken ribbon of asbestos varying in width from $1\frac{1}{2}$ " to 2", all long fibre. This can be followed for a distance of about 30 chains. The top seam is about 12 inches thick and contains a number of veins of asbestos with fibre lengths varying from $\frac{1}{8}$ " to 1".

Towards the Southern boundary of M.C. 163^H the deep gorge appears to terminate abruptly in a cliff, halfway across which the wide ribbon has been worked. After reaching this point it was necessary to descend to the creek bottom and scale, by means of a rope, a precipice about 60 feet high. Above this precipice the workings were continued on the western side of the gorge, until the wide ribbon of asbestos disappears into the floor of the gorge, some three or four chains upstream from the cliff. At this point the upper layer of this seam has widened out to a thickness of 2 feet, with lenticular veins showing fibre from $\frac{1}{4}$ " to 2" in length.

In addition to the seam described above, there exist two other parallel seams of asbestos, one about 20 feet above and the other 20 feet below the working seam. I examined these at one or two accessible points, and the top seam showed fibre up to 2 inches in length, while the bottom one showed two ribbons about 2 feet apart with $\frac{1}{2}$ " to $\frac{3}{4}$ " fibre. It is difficult to say whether these seams would be payable or not as they have not been opened up sufficiently for a

From the Eastern side of the gorge all three seams may be seen for the full length of the Western side, but they are not accessible for close inspection excepting at the cliff across the creek, where the asbestos in the working seam appears to be of better quality if anything than on the Eastern side.

Geological.

In the immediate vicinity of the asbestos deposits, the stratification of the rock appears to be as follows :-

(Hamersley Range Blue Asbestos).

Dolomite	18" to 2 ft.
Jasperoid Rock	6" to 9"
Ironstone Casing	$\frac{1}{2}$ " to 1"
Asbestos	1 $\frac{1}{2}$ " to 2 $\frac{1}{2}$ "
Ironstone Casing	$\frac{1}{2}$ " to 1"
Banded Quartzite	

Working.

The working to date has been confined to the main ribbon of long fibred material, as the hand dressing of the short fibres would be too costly under the present primitive conditions. The ironstone casing is very hard and very strongly attached to the fibre and it is a day's work for a man to clean from 1 to 2 bags (of 100 lb.) by hand knapping.

No actual underground work has been done. To date it has been possible to remove the overburden and get at the main asbestos ribbon. This method, however, has advanced in most places as far as it compatible with safety, as it is not permissible to undercut the cliff to any extent.

As it is probable that larger scale operations will commence in the near future, regular inspections will be necessary to see that safety precautions are observed.

If larger scale operations are to be undertaken, a certain amount of experimental work will be necessary in order to finally decide on the best and most economical method of mining.

Although to all appearances the deposit seems to be enormous, yet it is not known how far the asbestos extends into the face of the cliffs, and it is impossible at this juncture to give even an approximate estimate of reserves.

It is certain that, in mining, it will be necessary to leave a large proportion of pillars. In this the operations will bear some resemblance to coal mining. The proportion to be left cannot be estimated until such time as the deposit is opened up, and the nature of the ground tested. Many of these pillars may possibly be eventually won by packing behind them with the mullock which will form the greater part of the rock broken during mining operations. Until some experimental work is done, the quantity of fibre lost in pillars

Before entering into any contract to supply regular quantities to consumers, a certain amount of blocking out will be necessary in order to secure regularity of production.

Certain grading tests will be required to ascertain the percentages of different length fibre that can be anticipated, and the treatment of rock mined from development would be, I think the only reliable indication of the amount of fibre in the blocked out ore.

The method of handling ore and materials in this particular locality would doubtless be some sort of flying fox, to transport the ore to the plant and material to the miners on the cliff side.

Transport will also be an initial problem. At present donkeys are used to transport the bags of fibre to a point outside the gorge whence it can be handled by motor transport, but the provision of a passable road will be a necessity if major operations are to commence. Government assistance will doubtless be sought later in regard to this matter.

The Australian Blue Asbestos Company N.L. has purchased M.Cs. 163^H, 164^H, and 167^H and have taken up M.C. 169^H and are considering commencing immediate operations. It is not known at present what their exact intentions are, but in my opinion they would be wise if for the present they considered themselves in the light of a development and exploration company, installing a small plant for the treatment of their development ore, and developing and blocking out future ore reserves whilst making tentative marketing arrangements for the future.

Although it is impossible to make an estimate of reserves, I am confident that there is sufficient fibre in this gorge alone to warrant preparations for large scale mining operations, provided that a market can be found for the product at reasonable prices.

I also visited Vampire Gorge, but owing to rain setting in, which made climbing very dangerous, and promised to make the road to Mulga Downs impassable, I returned without an examination of this or Dale Gorge. From descriptions received, however, and samples of asbestos seen from these two localities, I have no reason to disbelieve that the deposits there are similar to that at Wittenoom Gorge.

Good floaters of long fibre have also been found as far as 30 miles Eastward from Vampire Gorge, which leads to the belief that there are other as yet undiscovered deposits in the Hamersley Range.

START COPY

INITIALS

DATE

BOX NO./FILE DRAWER NO.

SEGMENT NO.

S 2172

SIGNIFICANT

NOTES

all - B & B

Early letters - Re: Mining
Listing

Manville → Australian Mines