

Situation and Access:

The serpentine outcrop in which the asbestos occurs, crosses the Spero River, between points 20 and 60 chains respectively, east of its outlet to the sea. This area lies approximately 30 miles due south of Strahan. The Spero River discharges into Spero Bay, a large open roadstead on the southern side of Point Hibbs. Landings on the foreshores of the bay are only possible in comparatively calm weather conditions, which occur infrequently, and are of short duration.

For the purpose of inspection of the area, access was obtained by a launch journey to Birch Inlet in the south east corner of Macquarie Harbour, and some 24 miles from Strahan - thence by a pack track to the Spero River, 14 miles distant.

The cost of providing road access to the Spero River area from Macquarie Harbour, would be considerable, but would be necessary to maintain productive mining operations there.

Geological Setting:

Very little precise information is obtainable about the geology of the area south of Macquarie Harbour. Beyond a few tracks cut by timber getters, the country has not been opened up. There has been no geological survey work done, other than a reconnaissance of the coastal outcrops between the entrance to Macquarie Harbour and Spero Bay, by Mr. Loftus Hills.

The area traversed between Birch Inlet and the Spero is shown on the state geological map as Precambrian sedimentaries. The observations made on this journey, suggest that a belt of sedimentary rocks outcrop at Spero Bay and for some three to four miles eastwards. These sedimentaries are succeeded by a belt of porphyritic rocks, comparatively uncrushed, and ranging from intermediate to acid types. This porphyry belt appears to be flanked again on the east by slates. No estimate was made of the width of the prophyry occurrence.

Samples of a few of the rock types were collected and forwarded to the Government Geologist by Mr. K.A. Rae, Inspector of Mines, Queenstown.

The Serpentine:

The Tertiary coastal peneplain extends to within a few chains of the coast to the south of the Spero River. This plain, approximately 500 feet in elevation near the coast, is strongly dissected by the coastal rivers and their tributary streams. In the valley cut out by the Spero, the serpentine body has proven more resistant to erosion than the enclosing sedimentaries, with the result that it outcrops boldly on both sides of the river as a high rocky spur, sparsely covered with vegetation, except on the seaward slopes, where a tangled brush of Bauera and sword grass renders movement in that area most difficult.

Southwards from the river, the serpentine merges,

without special feature, into the peneplain. To the north the country is more rugged, and what happens to the serpentine is not so apparent, except that the differential cover of vegetation on the ultrabasic and the sedimentaries, suggests that the serpentine may pinch out within a mile or so.

The serpentine is flanked on the west by grey impure limestones(?) and purple tuffaceous slates, all of which are considerably crushed. On the eastern flank, the slates are more blacky and yellow in colour. The dip of sedimentaries is predominately easterly at angles, ranging from  $50^{\circ}$  to near vertical. The ultrabasic appears to have been emplaced concordant with bedding, possibly along a line of strike faulting. The strike of the rocks is very close to  $50^{\circ}$  east of true north.

The width of the ultrabasic does not exceed 40 chains - an east to west traverse over the Spero, on the south bank of the river, gave the following section -

Over a width of 7 to 8 chains along the eastern flank, the serpentine is very crushed and sheared, this is succeeded by 4 to 5 chains of fairly competent, slightly banded serpentine, which is followed by another zone of crushed material, 7 to 8 chains in width, containing uncrushed leases of antigorite serpentine. On the eastern side of this crush zone, there is a considerable width of markedly banded serpentine, which is discussed later - this competent banded serpentine becomes increasingly harder as the western boundary is approached. There has been some crushing along the western wall of the ultrabasic, but to a less extent to that observed along the eastern flank.

The banded serpentine, referred to above, is most interesting. The banding is most apparent on the weathered surface of the rock - dark brown bands have weathered differentially into relief with interspacing of a pale buff colour. The strike of the banding generally conforms to that of the main body, although local variations were noted, while the width of the bands would vary from  $\frac{1}{2}$  inch to a maximum of 6 inches. On breaking the surface, little difference in the colour or texture can be observed - the rock being green-black in colour, with a coarse texture.

A petrological examination of the rock suggest that, prior to serpentinisation, it varied in composition from a Iherzolite (olivine plus diopside) to an Enstatite Peridotite. The enstatite has been altered to bastite, from which some antigorite has developed.

Serpentinisation of the olivine appears to have occurred in at least two stages: (a) with the formation of serpophyte, possibly closely following emplacement, and (b) with the development of abundant antigorite in part derived from earlier serpophyte, and in part, probably from further serpentinisation during conditions of stress, i.e. during crushing and shearing. Chrysotile development accompanied

each stage, although the second was much the more important. It is not general for abundant chrysotile to develop from an antigorite serpentine, which suggest that the conditions under which serpentinisation occurred is unfavourable to extensive chrysotile development. No explanation is offered for the banding of the serpentine described earlier.

Asbestos Occurrence:

The showing of fibre, in all cases, was insufficient to encourage further investigation of the outcrop. Floaters of serpentine, containing fibre veins up to  $\frac{3}{8}$  inch in width, were found along a dry creek bed, crossing the more easterly zone of competent serpentine. The best showing in situ was observed on the south side of a small creek, flowing seawards on the western fall of the hill. These veins occasionally measured up to  $\frac{1}{2}$  inch in width, but their occurrence was sporadic. Fibre occurrence appeared to become less as one moved in a direction remote from the zones of crushing. The stresses which have been applied to the ultrabasic, appear to have been unrelieved lateral pressure, accompanied by shearing parallel to dip of the body.

The fact that crushing has resulted over such wide zones wherein the rotational stresses of the shearing would be relieved, does not suggest the existance of appreciable areas strained in response to tensional stresses. As chrysotile development is usually achieved under conditions of tension, it does not appear likely that such development has occurred.

The chrysotile observed was a strong, rather dry, fibre, which, if occurring in sufficient quantities, would be applicatle to asbestos cement manufacture.

Conclusions.

1. The fibre veins are sporadic and of scant occurrence. The quality of the fibre is good, but somewhat dry.
2. The Serpentine developed is mostly antigorite, which is not considered favourable to fibre development.
3. It does not appear that a vein system, adequate for the existance of a commercial deposit of chrysotile asbestos, has been developed.
4. Future prospecting the area between the Spero River and Macquarie Harbour may bring to light new serpentine areas more favourably situated for the occurrence of chrysotile asbestos.

DEPARTMENT OF MINES.  
HOBART.

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