

TR4-28-34

SILICA DEPOSITS NEAR HASTINGS

by T. D. Hughes.

ABSTRACT

Large deposits of high grade silica, in the form of quartzites of Precambrian age occur in two localities in the vicinity of Hastings Caves road in southern Tasmania.

INTRODUCTION

In response to a request from the Department of Industrial Development, an investigation has been made of two silica deposits, situated near Hastings in southern Tasmania. The first of these, known as the Boars Back, is held under lease by the Commonwealth Carbide Company, and material from here was used by them in the manufacture of ferro-silicon during the last war. The second has been quarried extensively for road making material.

Both are situated close to the Hastings Caves road and lie within a few miles of the village of Hastings, which is itself but three miles from the port of Southport or Hythe as it is sometimes called.

I. THE BOARS BACK DEPOSIT

Location and Access

As the name suggests, this is a striking humped back ridge, half a mile in length and four hundred feet wide, rising one hundred and fifty feet from the button grass plain. It may be reached by following an old tramline, which commences at a point on the Hastings Caves road, four miles from the Catamaran road. This tramway, half a mile in length, traverses very thick forest and is built up on logs, most of which are now rotten. Just before reaching the Boars Back, it emerges onto a small open button grass plain. The hill is held under mineral lease by the Australian Commonwealth Carbide Company Ltd., and comprises section 11647 M, 50 acres; 58/40M, 10 acres and 13/41M, 10 acres.

Geology

This white quartzite occurs in the Upper Precambrian and underlies extensive dolomite beds, part of which can be well studied in the vicinity of the Hastings Caves. The dolomite does not outcrop freely, but underlies much of the low-lying plains in this locality. It is interesting to note that these rocks represent the most easterly occurrence of the Precambrian in southern Tasmania. The quartzite may be correlated with the Bryant Hill Quartzite of the Smithton district, where it also underlies dolomite and has a thickness of 1500 feet. At Hastings, the thickness is about 500 feet.

The quartzite is well exposed in a quarry on the north-western flank of Boars Back. The beds strike almost due north and dip to the west at high angles forming portion of the western leg of an anticline. Further south the strike swings more to the west of north.

Jointing is very pronounced in two directions and should be an aid in the breaking of stone. One set of joints is at right angles to the bedding and dips at 10° to the east, while the other joint

LOCALITY MAP SILICA DEPOSITS - HASTINGS

0 40 80 CHS.

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APRIL 1959

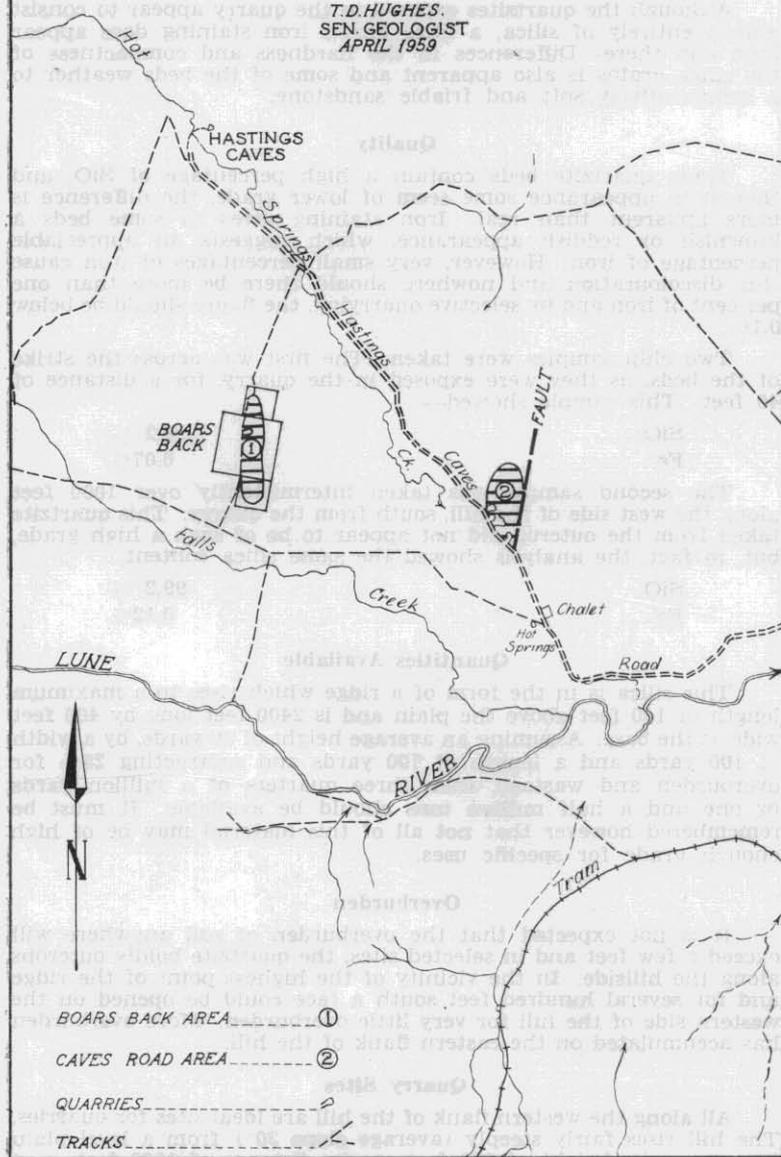


FIGURE 6.

planes strike east and dip south at 50° to 80°. Minor faults and small crush zones may be seen in the quarry, coincident with this second set of joint planes.

Although the quartzites exposed in the quarry appear to consist almost entirely of silica, a little brown iron staining does appear here and there. Differences in the hardness and compactness of the silica grains is also apparent and some of the beds weather to a comparatively soft and friable sandstone.

Quality

These quartzite beds contain a high percentage of SiO₂ and though in appearance some seem of lower grade, the difference is more apparent than real. Iron staining gives to some beds a brownish or reddish appearance, which suggests an appreciable percentage of iron. However, very small percentages of iron cause this discolouration and nowhere should there be more than one per cent of iron and by selective quarrying, the figure should be below 0.1%.

Two chip samples were taken. The first was across the strike of the beds, as they were exposed in the quarry, for a distance of 40 feet. This sample showed—

SiO ₂	99.2 %
Fe	0.07%

The second sample was taken intermittently over 1000 feet along the west side of the hill, south from the quarry. This quartzite taken from the outcrop did not appear to be of such a high grade, but, in fact, the analysis showed the same silica content.

SiO ₂	99.2 %
Fe	0.12%

Quantities Available

This silica is in the form of a ridge which rises to a maximum length of 140 feet above the plain and is 2400 feet long by 400 feet wide at the base. Assuming an average height of 30 yards, by a width of 100 yards and a length of 700 yards and subtracting 25% for overburden and wastage, then three quarters of a million yards or one and a half million tons should be available. It must be remembered however that not all of this material may be of high enough grade for specific uses.

Overburden

It is not expected that the overburden of soil anywhere will exceed a few feet and in selected sites, the quartzite boldly outcrops along the hillside. In the vicinity of the highest point of the ridge and for several hundred feet south a face could be opened on the western side of the hill for very little overburden. More overburden has accumulated on the eastern flank of the hill.

Quarry Sites

All along the western flank of the hill are ideal sites for quarries. The hill rises fairly steeply (average slope 30°) from a level plain to an average height of 100 feet over a distance of 1500 feet.

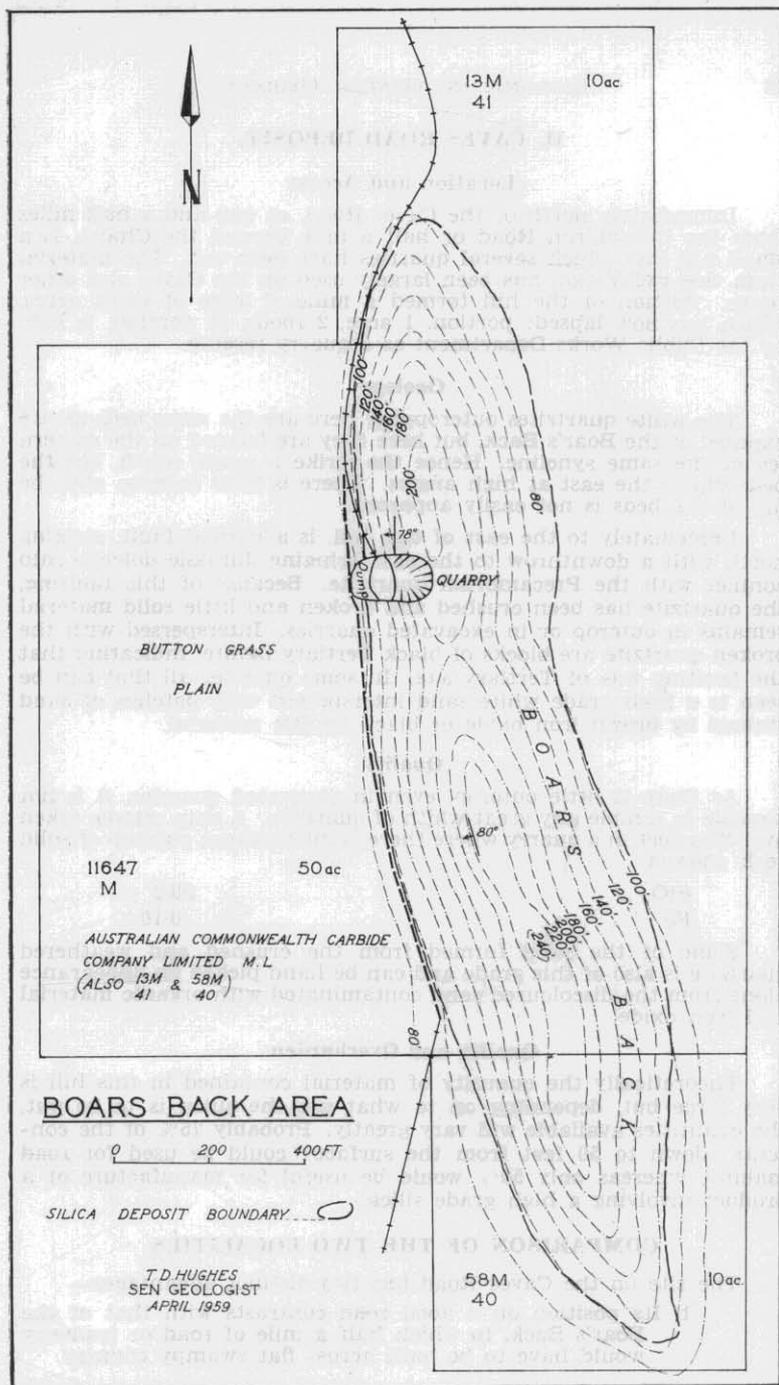


FIGURE 7.

5 cm

II. CAVES ROAD DEPOSIT.

Location and Access

Immediately north of the Caves Road, at two and a half miles from the Catamaran Road or half a mile beyond the Chalet, is a small hill into which several quarries have been cut. The material from this excavation has been largely used on the Caves and other roads. Portion of the hill formed a mineral lease of eight acres, which has now lapsed; portion, 1 acre, 2 roods, 28 perches, is held by the Public Works Department as a quarry reserve.

Geology

The white quartzites outcropping here are the same beds as are exposed at the Boar's Back, but here they are located on the eastern leg of the same syncline. Hence the strike is again north, but the beds dip to the east at high angles. There is little outcrop and the dip of the beds is not easily apparent.

Immediately to the east of this hill, is a normal fault, striking north with a downthrow to the east bringing Jurassic dolerite into contact with the Precambrian quartzite. Because of this faulting, the quartzite has been crushed and broken and little solid material remains in outcrop or in excavated quarries. Interspersed with the broken quartzite are blocks of black Tertiary lignite, indicating that the faulting was of Tertiary age. In some quarries all that can be seen is a high grade white sand interspersed with patches of sand stained by brown iron oxide or black lignitic material.

Quality

As there is little outcrop, even in excavated quarries, it is not possible to sample any great width of quartzite. A chip sample taken over fifty feet in a quarry where there is intermittent outcrop of solid rock showed

SiO ₂	99.2 %
Fe	0.10%

Some of the sand formed from the crushed and weathered quartzite is also of this grade and can be hand picked on appearance alone from the discoloured sand contaminated with organic material and iron oxide.

Quality and Overburden

Theoretically the quantity of material contained in this hill is very large but, depending on to what use the silica is to be put, the quantities available will vary greatly. Probably 75% of the contents (down to 50 feet from the surface) could be used for road making, whereas only 50% would be useful for manufacture of a product involving a high grade silica.

COMPARISON OF THE TWO LOCALITIES

The site on the Caves Road has two distinct advantages—

1. Its position on a good road contrasts with that of the Boar's Back, to which half a mile of road or tramway would have to be built across flat swampy country.

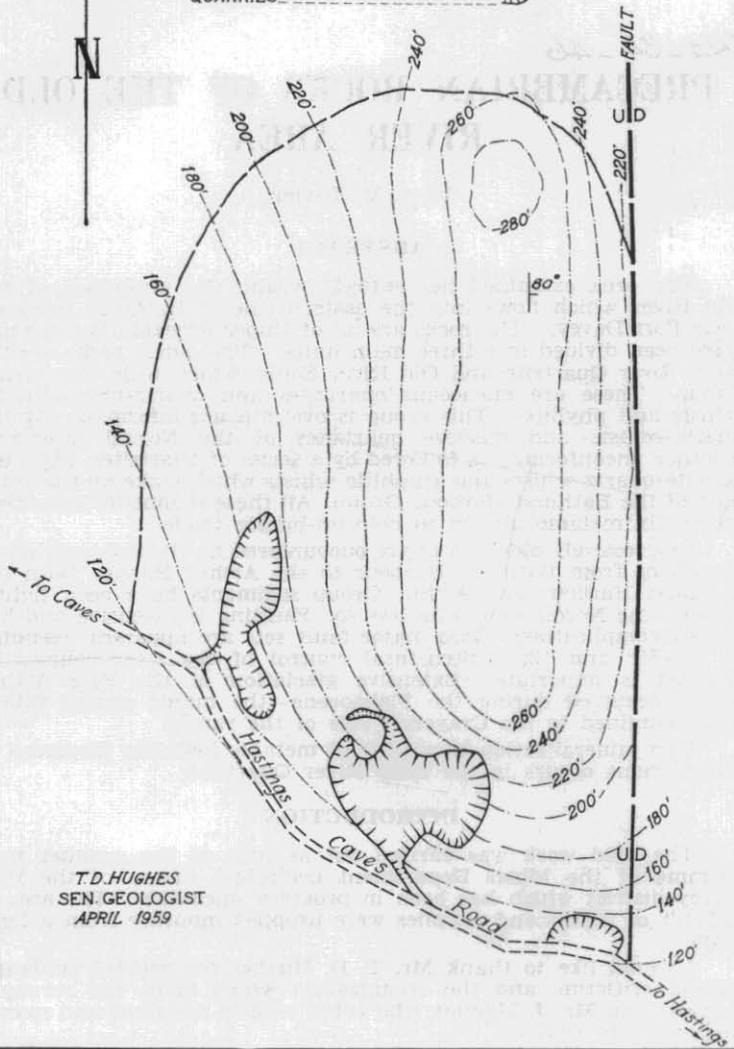
CAVES ROAD AREA

0 200 400 FT



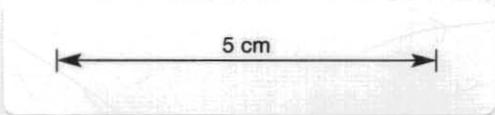
SILICA DEPOSIT BOUNDARY 

QUARRIES 



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FIGURE 8.



2. Portion of the land is not held under mineral lease or reserve, whereas all the silica at the Boars' Back is included in current mineral leases.

On the other hand, the material is much inferior and large tonnages stained by organic material and iron oxide would have to be discarded.