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PETROLOGICAL REPORT NO. M.11/64

SPECIMENS FROM BALFOUR, TASMANIA

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MICROFILMED

Melbourne

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Four specimens from Balfour, Tasmania, submitted by Mr. A.M. McKenzie, 16th March, 1964.

SPECIMEN NO. 1:

White quartz from one of a number of quartz bands arranged en echelon.

Orthoquartzite or quartz vein?

Thin Section M.788:

Composed of relatively large (to 4 mm) strained quartz crystals commonly with sutured or granulated grain boundaries. The quartz is cloudy due to an abundance of minute cavities, a few of which have gas bubbles showing Brownian movement.

Lines of incipient granulation cross some crystals.

There is no evidence of sedimentary material.

Conclusion:

Quartz from a vein probably formed at considerable depth.

SPECIMEN NO. 2:

A hard, fine grained, grey rock of uniform colour and texture.

Thin Section M.789:

Essentially a fine grained quartz mosaic crowded with inclusions of sericite, chlorite, very fine grained recrystallised leucoxene, traces of carbonaceous ? material, traces of very fine grained authigenic tourmaline and very rare minute carbonate grains. There are very rare small (less than 0.01 mm) rounded zircons.

In their present form, the quartz grains show no evidence of clastic origin and the mosaic is the result of either complete recrystallisation or, as the appearance suggests, of silicification.

Conclusion:

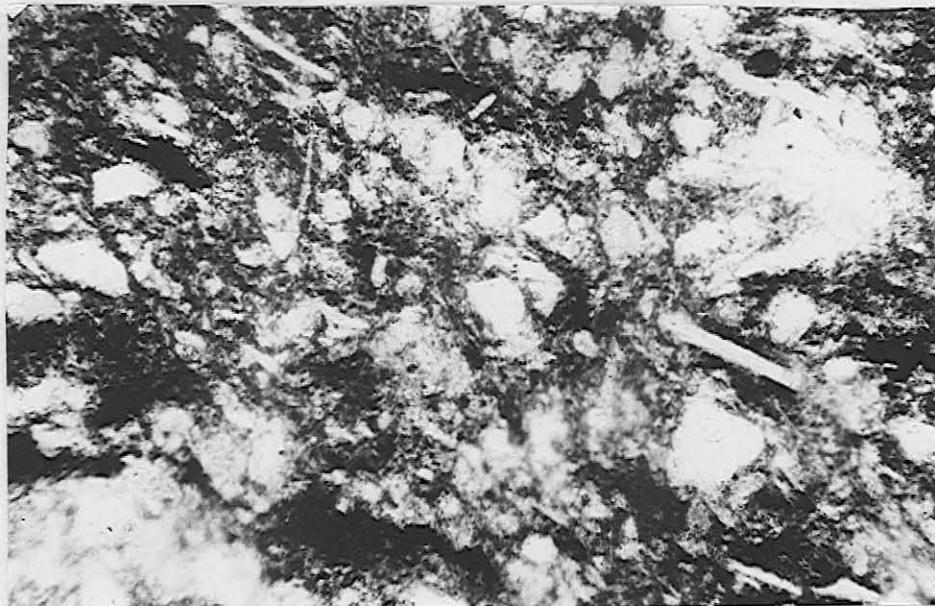
Impure fine grained quartzite possibly formed by silicification

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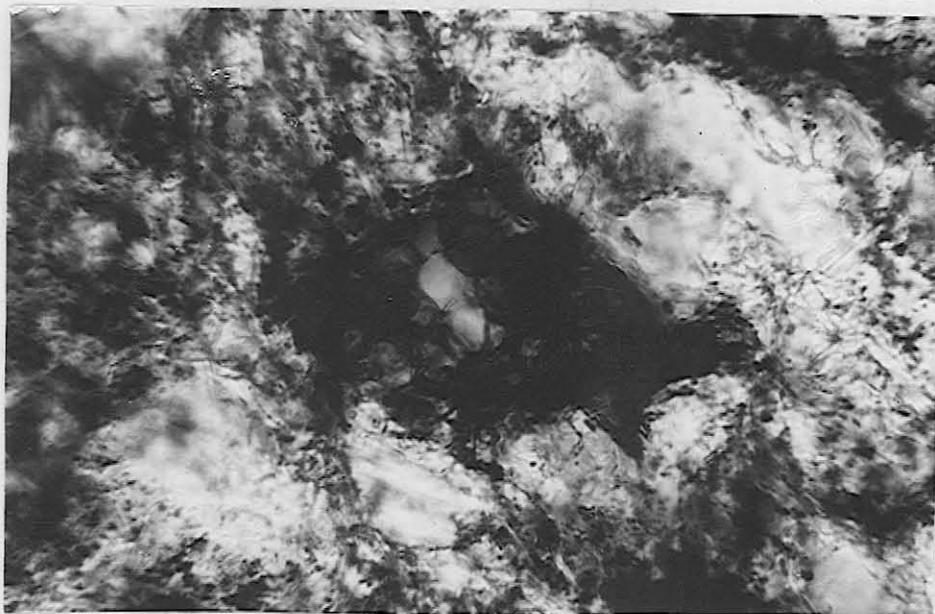
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of mudstone which may have contained some carbonate.



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THIN SECTION M.790 (X.168)

Carbonaceous micaceous siltstone.



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THIN SECTION M.790 (X.850)

Probable fossil micro-organism. Cellular structure composed of spherical bodies.

SPECIMEN NO. 3:

A fine grained grey rock with minor white mica along a bedding plane.

Thin Section M.790:

Composed of rounded to angular quartz grains commonly 0.05 - 0.1 mm with some to 0.2 mm, flakes of muscovite and accumulations of fine grained carbonaceous or graphitic material in a matrix composed mainly of extremely fine grained sericite, chlorite and carbonaceous material.

Accessory minerals include aggregates of recrystallised leucoxene, rounded tourmaline (0.1 mm) and very rare rounded zircon.

Mica flakes and shreds or accumulations of carbonaceous material tend to lie parallel to the bedding. A few have been crumpled.

The rock contains a small contorted quartz vein probably formed by lateral secretions of silica.

In this slide there are two small areas (approximately 0.1 mm across) in which reddish brown staining outlines an apparent cellular structure consisting of a three dimensional packing of very small spherical bodies each about 0.02 mm diameter. In general appearance this is similar to a cellular structure noted in very fine grained chamosite and siderite from Constance Range, Queensland, believed to be of Proterozoic age. It is difficult to imagine these being other than fossil micro-organisms.

Conclusion:

Micaceous, carbonaceous siltstone with possible fossil micro-organisms.

SPECIMEN NO. 4:

Core from DDB.4 at 314.3 ft. (M.791). Minerals present are:

Coarse grained, pale brown siderite.

R.I. No = 1.86, $N_E 1 = 1.73$ - nearly pure $FeCO_3$.

White vein quartz.

Fine grained muscovite, - a few crystals are included within siderite.

Arsenopyrite and chalcopyrite.

The chalcopyrite tends to occur along grain boundaries between quartz and siderite and was relatively late.

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One specimen from DDB.3 at 83 ft. was submitted earlier in the year.

Thin Section M.769:

Composed mainly of very fine grained quartz and sericite with small crystals of tourmaline scattered throughout the rock. Occasional rounded quartz grains suggest this was originally a fine grained sediment.

The tourmaline is not detrital. It has formed either by introduction of boron from external sources, or from boron absorbed by marine muds forming the original sediment.

There are rare grains of rutile or anatase, very rare rounded pink to brown zircons and scattered spongy aggregates of leucoxene.

Rounded and sub-hedral outlines of a few patches of coarser grained sericite and muscovite suggests pseudomorphous replacement of earlier grains, the identity of which cannot be determined. Traces of leucoxenic material through some of these indicate that they contained minor titanium.

Conclusion:

Sericitic quartzite in which at least part of the sericite has formed by the action of solutions. Authigenic tourmaline indicates either introduced boron or boron absorbed by marine muds in the original sediment.

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