METAMORPHOSED LIMESTONE IN THE TRINITY PENINSULA SERIES OF GRAHAM LAND

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IN July 1962 the Hektoria Glacier area on the east coast of Graham Land was geologically mapped. In a ridge projecting from the back wall of Hektoria Glacier, there is an exposure of metamorphosed limestone which has been assigned to the Trinity Peninsula Series.

The Trinity Peninsula Series has been described in detail by other workers (Adie, 1957; Aitkenhead, 1965; Elliot, 1965) but, although calcareous sediments are frequently encountered, the development of limestone has not been recorded previously. Therefore, the occurrence of this metamorphosed limestone is of considerable interest.

The limestone was recorded only at station D.4626 (Fig. 1) and it was not seen elsewhere. The main outcrop is 200 m. high and about 100 m. wide, but there are also a few smaller

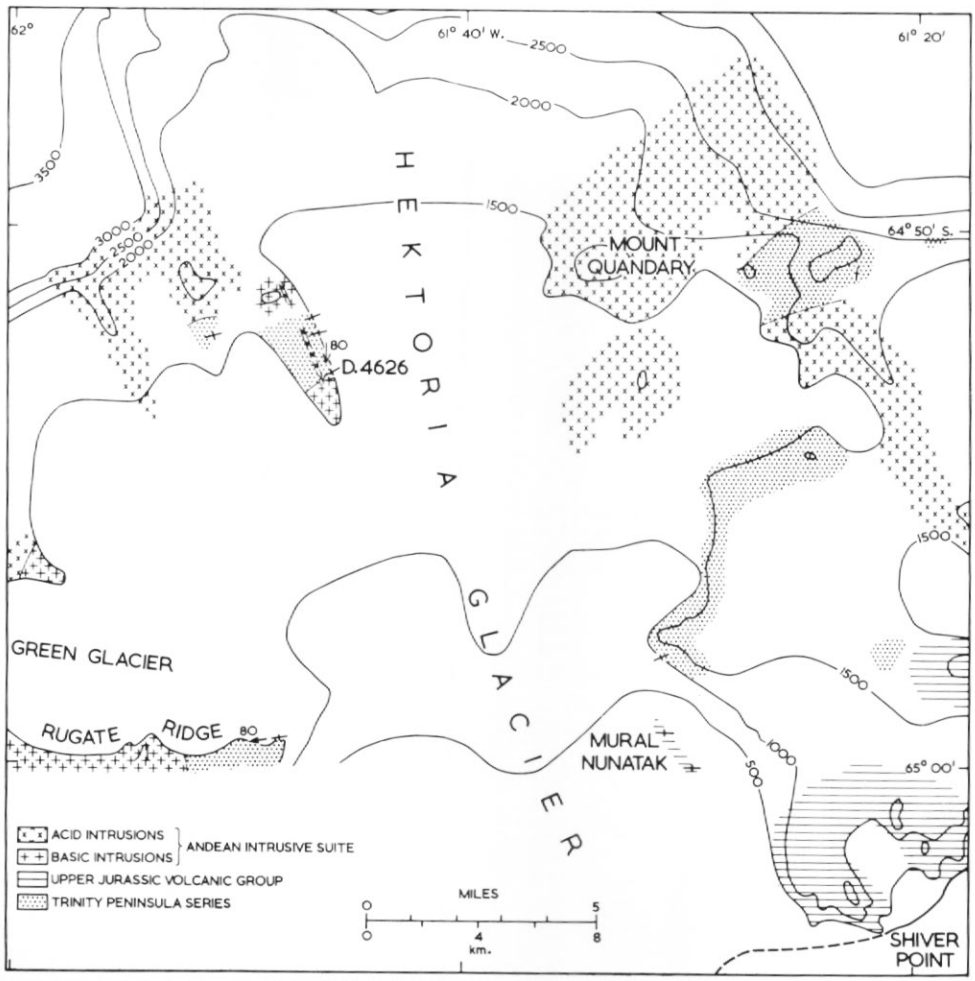

Fig. 1. Geological sketch map of the Hektoria Glacier area, showing the position of station D.4626 where a metamorphosed limestone of the Trinity Peninsula Series is exposed.

exposures higher on the same ridge. To the north-east there is a gradual transition from the limestone into the argillaceous rocks of the Trinity Peninsula Series, but to the south-west it is intruded by an Andean diorite. The contact with the diorite can be seen from a distance to be sharp, but at the foot of the cliffs there is a deep gully which prevented access to the contact. The limestone is also intruded by doleritic dykes (? Tertiary) (Fig. 2) but the metamorphic effect of these is not considered to be significant. Its light colour contrasts strongly with both the sediments of the Trinity Peninsula Series and the Andean diorite; from a distance it could

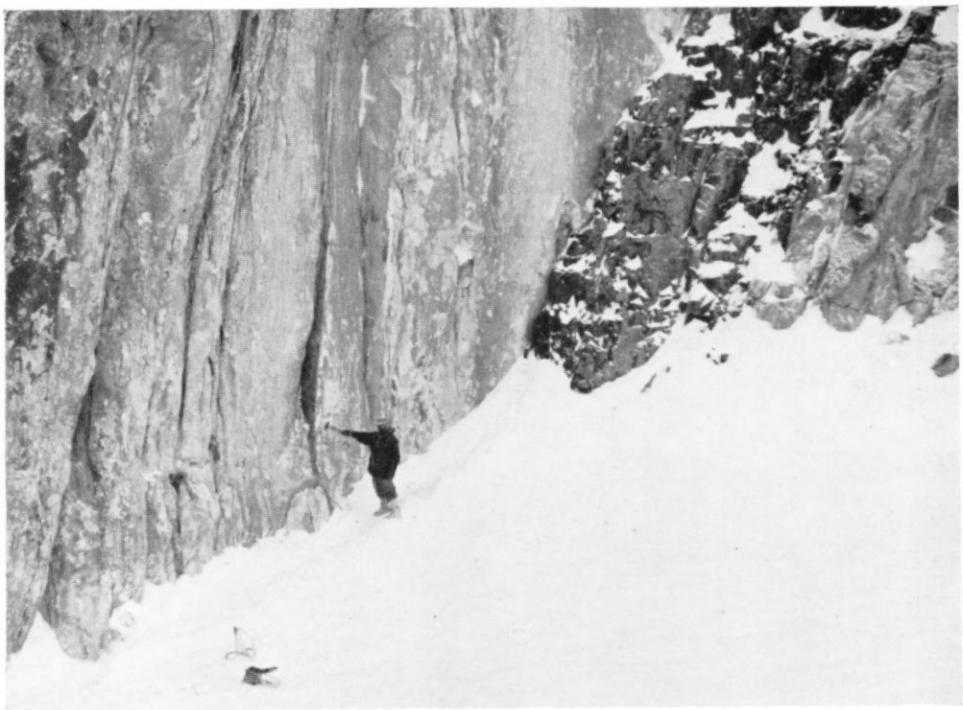

Fig. 2. The metamorphosed limestone exposure in the Hektoria Glacier area. The thick band of dark rock is a (?) Tertiary doleritic dyke and the thin vertical bands are shales interbedded with the metamorphosed limestone.

easily be confused with one of the light-coloured Andean granites. The main mass of the limestone is conformable with the Trinity Peninsula Series sediments, which are vertical in this area. This is seen in the interbedded shale bands (Figs. 3 and 4), which also show that the limestone is younger than the sediments.

A few spherical or elliptical ghost structures about 10–20 cm. long were seen in the limestone but they could not be collected because of the nature of the rock. No detail was visible and the vague outline was only marked by a slight change in colour. These were probably fossils in the original limestone.

The limestone has suffered contact metamorphism as a result of the intrusion of the Andean diorite and it now consists of a coarse-grained, pure white marble. The grain-size of the calcite crystals varies from 0·2 to 8·0 cm. (Fig. 4).

The thin section reveals that, even in the vicinity of the shale bands interbedded in the limestone, the calcite is very pure. The crystals are anhedral and equigranular, but they tend to become inequigranular and decrease in grain-size in the vicinity of the shale bands. These are now represented by numerous minute granules of graphite, which is mainly concentrated in bands between the calcite crystals; however, some calcite crystals contain inclusions of

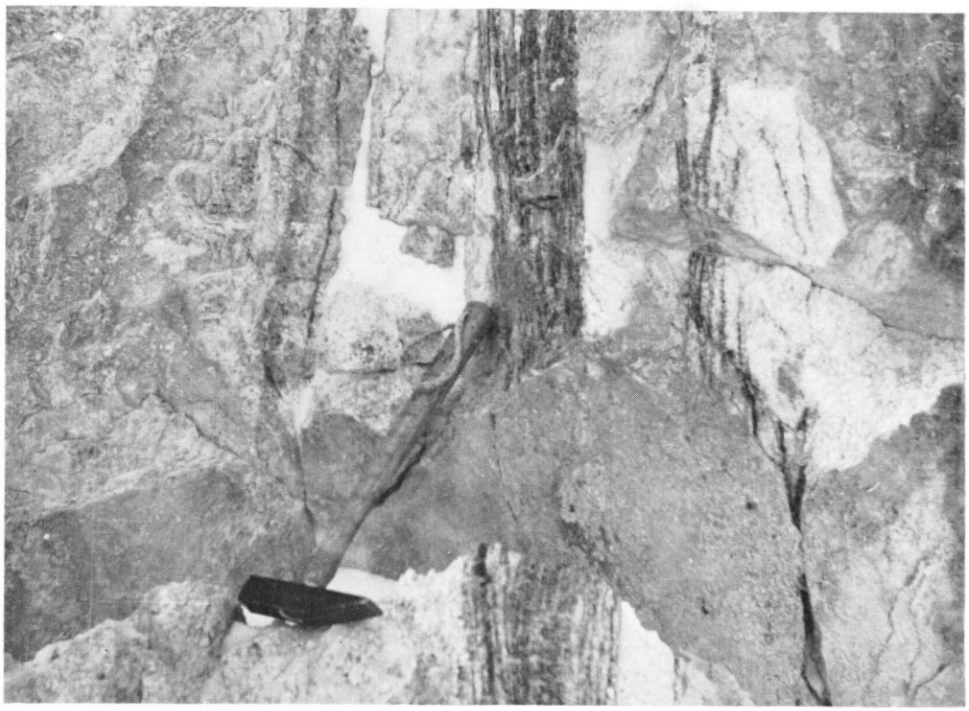

Fig. 3. A typical shale band interbedded with the metamorphosed limestone.

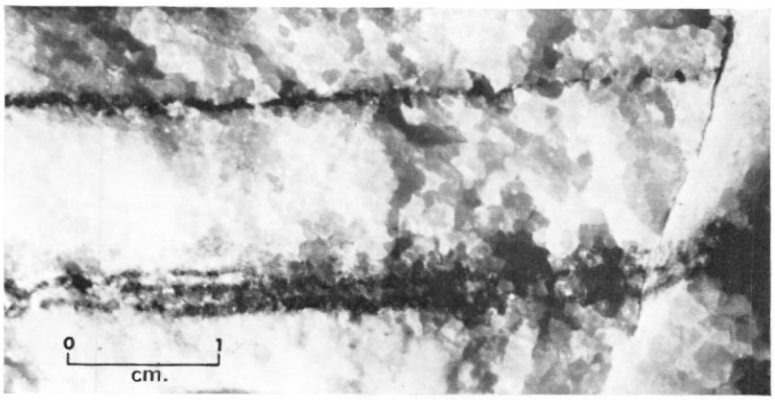

Fig. 4. Thin shale bands interbedded with coarsely crystalline metamorphosed limestone.

graphite. Occasional small flakes of a colourless micaceous mineral are present in association with the graphite. The 2V of this mineral is small, and therefore it is probably phlogopite.

The local character of the limestone suggests that it was originally a reef limestone, perhaps formed towards the end of the deposition of the Trinity Peninsula Series. The contact metamorphism has destroyed all but the coarsest organic features which remain only as the vaguest outlines.

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