Tasmania Department of Mines—Report 1989/16

Palygorskite from Edith Creek

by R. S. Bottrill

Abstract

Palygorskite was identified as a constituent of fault gouge near Edith Creek. The occurrence is too small to have any economic interest, and the origin is uncertain, but this appears to be the first recorded occurrence of the mineral in Tasmania.

INTRODUCTION

Palygorskite is a hydrated magnesium silicate $(Mg,Al)_2Si_4O_{10}(OH).4H_2O$, generally categorised as a clay mineral but with a structure closely related to the chain structures of the amphiboles (Bradley, 1940). It has a number of synonyms, including attapulgite, lassallite and pilolite, and is closely related to sepiolite. It is locally common in some soils and sediments where conditions are rather alkaline and Mg-rich, and has a growing commercial demand as an absorbent, catalyst, pharmaceutical component, and in many other products. In industrial use it is usually described as 'Fuller's Earth' or 'attapulgite'.

OCCURRENCE

The occurrence of palygorskite (in a quarry one kilometre east of Edith Creek) was discovered fortuitously during an investigation of a possible gold prospect. The location and geology is described in more detail in Bottrill (1989). Palygorskite was found in only one sample (C102639), in a puggy fault gouge containing clasts of pyritic sandy limestone and pyritic siltstone. The host rock is a pyritic siltstone, probably a Crimson Creek Formation equivalent, close to the top of the Smithton Dolomite. There are a number of fault gouges present, typically less than 0.5 m wide, containing clays and sometimes iron oxides.

IDENTIFICATION

Several samples of clay from fault gouges were analysed. Most contain chlorite and/or montmorillonite-group minerals with minor illite. Sample C102639 contained palygorskite, 'swelling chlorite' (?corrensite or interlayered chlorite/montmorillonite?) and minor illite (see fig. 1).

DISCUSSION

The occurrence of palygorskite at this locality is very restricted and thus of no commercial interest. This occurrence is notable, however, as palygorskite is usually restricted to alkaline, Mg-rich environments, and is typical of soils and sediments in arid regions (Dhannoun and Al-Dalbach, 1988). It may also form by alteration of serpentine, pyroxenes and amphiboles (Dhannoun and Al-Dalbach, 1988; Carroll, 1970).

The occurrence of palygorskite in fault gouges is unusual (Soong and Perrin, 1983) and requires further study to determine its origin. It may, however, be an indication of Mg-rich host rocks, although the geochemistry of these rocks is not known. The chlorite and montmorillonite in the fault gouges support a Mg-rich environment. The limestone in the fault would raise the alkalinity and support palygorskite formation.

REFERENCES

BRADLEY, W. F. 1940. The structural scheme of Attapulgite. *Amer. Mineral.* 25:405–410.

BOTTRILL, R. S. 1989. The Edith Creek gold prospect. *Rep. Dep. Mines Tasm.* 1989/14.

CARROLL, D. 1970. Clay minerals : A guide to their X-ray identification. *Spec. Pap. geol. Soc. Amer.* 126.

DHANNOUN, H. Y.; AL-DABBAGH, S. M. A. 1988. Origin and chemistry of palygorskite-bearing rocks (Middle Eocene) from northeast Iraq. *Chem. Geol.* 69:95–101.

SOONG, R.; PERRIN, N. D. 1983. An occurrence of palygorskite in a fault gouge, Karrori, Wellington, New Zealand (Note). *NZ J. Geol. Geophys.* 26:217.

[7 June 1989]

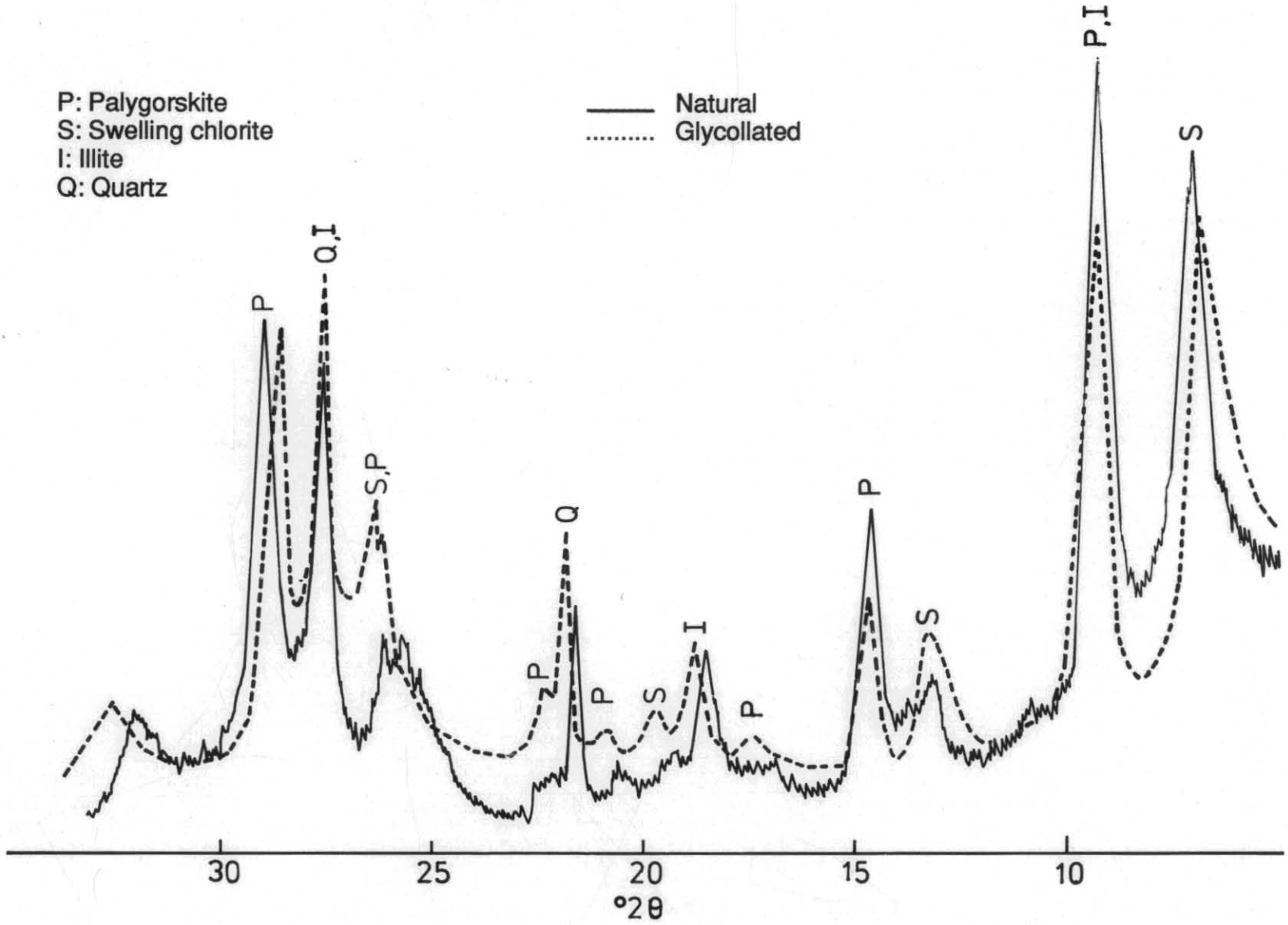

Figure 1. *XRD traces of glycollated and unglycollated samples of palygorskite-bearing clay from Edith Creek. CuKα radiation*