

Possible Origins and Ages for Sapphire and Diamond from the Central Queensland Gem Fields

A.D.C. ROBERTSON¹ & F.L. SUTHERLAND²

¹ Queensland Department of Resource Industries,
PO Box 194, Brisbane, Qld 4001, Australia

² Mineralogy & Petrology Section, Australian Museum,
PO Box A285, Sydney South, NSW 2000, Australia

ABSTRACT. Mining of sapphire has been carried out for over 100 years on the central Queensland gem fields. Zircon and the occasional diamond, like the sapphires, occur as clastic grains. The Hoy Basalt (a Tertiary basalt province of plugs and restricted flow remnants) was considered to be the source of the sapphire and zircon. Age determinations on basalts of the Hoy Province indicate eruption at different times from the early Eocene to the Middle Miocene. The recognition of sapphire and zircon bearing pyroclastic deposits at Bedford's Hill, the Divide and near Sheep Station Creek in the Rubyvale area suggests that most of the sapphire and zircon in the alluvial deposits came from the pyroclastics and not from the weathering of basalt.

Evidence points to sapphire and zircon-bearing felsic parental rocks, which were crystallised around the crust-mantle boundary. The gem minerals were largely brought to the surface by pyroclastic eruptions, particularly during the Early to Middle Eocene. Two groups of alluvial zircons (smaller, pale yellow crystals and large reddish brown crystals) give separate fission track ages. These suggest eruptive thermal resettings around 58 Ma and 20 Ma respectively. The apparent absence of substantial volcanism in the southern part of the Anakie Inlier during the Jurassic and Cretaceous probably reflects a cooler regional geotherm. The occurrence of low-uranium zircon of Late Cretaceous age (66 Ma) in some of the gem field clastic deposits suggests that conditions may have been appropriate for the emplacement of diamond bearing material during this period.

ROBERTSON, A.D.C. & F.L. SUTHERLAND, 1992. Possible origins and ages for sapphire and diamond from the central Queensland gem fields. Records of the Australian Museum Supplement 15: 45-54.

The central Queensland gem fields (Fig.1) have been producing sapphire, zircon and occasional diamonds for more than 100 years (Robertson, 1980). The source of this sapphire was considered to be the Hoy Basalt by previous workers (Jack, 1892; Dunstan, 1902; Veevers

et al., 1964; Stephenson, 1976, 1990).

Jack (1892) concluded that the basalt was the source of the sapphire after observing the association of pleonaste and sapphire in the alluvial deposits. He also observed that zircon was prolific and was associated with