

Gambier Stone

— premium dimension stone from the South-East



Jeff Olliver (Consulting Geologist, Olliver Geological Services)

Introduction

Following promotion at Verona, Italy in September 2001, interest has been rekindled in the classic light-weight fossiliferous limestone known as Gambier Stone, a traditional Australian dimension stone. Gambier Stone is produced from the Marte area, 10 km west of Mount Gambier in the South-East of South Australia. This region is the largest producer of dimension stone in Australia.

Building blocks of the limestone, called ashlar, have been used since colonisation when the Arthur brothers, the first pastoralists, cut blocks to build their huts on the edge of Little Blue Lake ~14 km south of Mount Gambier.

After the trip to the South-East in 1844 by Governor Grey and George Fife Angas, the latter wrote in his 1847 journal:

The walls of the hut, troughs, seats and various utensils, were entirely formed of white coral: this substance, when fresh cut, is soft like salt, and easily hewn into any shape; but on exposure to air it gradually hardens, and becomes perfectly durable.

The oldest known limestone building and reputedly the first two storey in the

region, the Sisters of Mercy Convent, was built during 1856–57 and demolished as recently as 1985.

Mining

Quarries were opened in many locations near Mount Gambier but the highest quality ashlar, and by far the bulk of production, has come from two northwesterly trending lines of quarries at Marte. Output averaged 8500 t/y during 1924–50, 20 100 t/y during 1951–86, and 11 000 t/y during 1987–2001.

The peak of 36 344 t was reached in 1953 when 11 quarries employing 100 workmen produced 1340 m³ of ashlar per week. Seventy percent was for local use and 30% was railed to Adelaide where 2000 ashlar were used each day to build one-third of the houses in the metropolitan area. At the end of 2001, four quarries were operating.

Total production from 1842 to 2001 has been estimated at 1.5 Mt.

Mining methods

The original technique involved two men cutting one-metre-square pillars from the quarry face using hand-pulled cross-cut saws. These pillars were toppled to the

floor and sawn either into large blocks for transport to building sites for further cutting or directly into ashlar.

The first on-site sawing plant, consisting of a bank of six power-driven circular saws, was installed in 1919. In 1947, Dudley Pritchard adapted a timber logging machine for direct cutting of pillars from the quarry face.

The increased demand in 1950 caused the government to investigate wire saws and coal cutters. Despite favourable results, the quarrymen rejected these in favour of the self-propelled, petrol-driven circular saws invented by Ivan Ploenges. By 1961, 48 of these saws were in use; limestone off-cuts were burnt in two lime kilns to produce ~250 bags/week of lime.



Hand sawing of a toppled pillar of Gambier Stone in 1950. Note solution cavities and root holes. (Photo N008585)



Quarry near Mount Gambier in 1920 showing hand-sawn faces in background, toppled pillars in right foreground and stacked ashlar of Gambier Stone at left. (Photos N000471, N000472)



Block sawing in 1986 using self-propelled, petrol-driven Ploenges saws, Steely Quarry near Mount Gambier. (Photo 038199)

Geology

Marine transgression from the Middle Oligocene to Early Miocene (38–15 Ma) during continued subsidence of the Gambier Embayment produced ideal conditions for extensive colonies of bryozoa (or lace coral) to flourish on an open-marine shelf. Sedimentation and coral development was widespread over much of what is now the Lower South-East (Fig. 1), and the Gambier Limestone as it is now known reached a maximum thickness of 400 m (mostly offshore from the present coastline). Uplift and erosion in the mid-Miocene terminated deposition.

Detailed studies during 1967–73 subdivided Gambier Limestone into the following three units:

- upper — grey cherty limestone
- middle — cream limestone, the main source of dimension stone with tens of metres of massive bryozoal calcarenite characterised by high porosity, high permeability, very little clay and few chert or flint beds
- lower — grey limestone.

Present-day topography is karstic, with limestone overlain by thin sandy soil. Dissolution, particularly along joints and bedding planes, has created sinkholes and caves with reprecipitation forming stalactites and stalagmites.

At Marte, limestone is massive and bedding rarely evident. Dip is generally horizontal to three degrees. The quarries are aligned northwest–southeast, parallel to the trend of regional jointing, in two lines with the main zone 6 km long and 200 m wide. This regional jointing

probably developed ~5000 years ago during the last volcanic eruption that formed Mount Schank. However, joints are rare in the stone quarries.

High-quality ashlar are produced from limestone which has been extensively modified by migrating groundwater, where a thin coating of crystalline dolomite cements fragments of bryozoa. A proportion of these fragments have also been dissolved and reprecipitated in pore spaces as very poorly crystalline to amorphous limestone matrix. Although very white, this matrix tends to be chalky and friable.

Products

Ashlars comprise light-weight, fine to medium-grained, fragmental, bryozoal limestone with high insulating and acoustic properties. Colour ranges from white, light cream, cream to light brown. Dimensions are usually 660 mm long, 240 or 290 mm high, and 100–300 mm thick depending on use. Window and door sills are usually 1.32 or 1.98 m long. All sizes can be supplied as plainface, rockface, bevel edge or in special shapes to customers requirements.

Gambier Limestone has also yielded significant quantities of agricultural lime, whiting, glass-grade limestone, lime and hydrated lime, and is a cheap local source of road rubble.

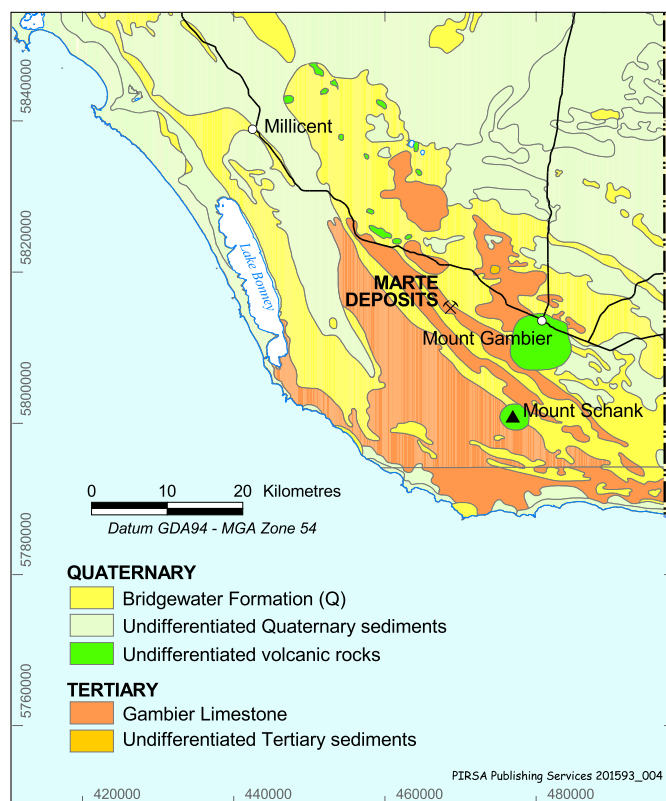


Fig. 1 Geology of the Mount Gambier region.

Large in-ground resources are sufficient to sustain production at the present rate for many years.

Acknowledgement

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Further reading

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