GRANITIC GIRRAWEEN

Why all this rock?

Girraween means 'place of flowers', but it is also a place of rock – lots of it. Granite rock is everywhere – in piles of rounded boulders, exposed slabs in ridges and creeks, and great bare domed mountains rising above the valleys. The result is probably the best example of a granite landscape in Queensland, but where did all the rock and its fantastic shapes come from?

Together the outcrops form just one small section of a great mass of rock – the Stanthorpe Granite - which underlies most of the Granite Belt. This body is itself only part of an even larger complex of granitic rocks of different ages stretching south to Armidale in New South Wales - the New England Batholith.

Molten origins

The Stanthorpe Granite was originally a molten mass of magma that was intruded into older surrounding rocks about 240 million years ago, in the early Triassic period. While still deep below the surface, it cooled very slowly, allowing its minerals to solidify and grow into large crystals, which are evident in the rocks today. Since that time, erosion has gradually removed the vast quantities of rock above its roof (maybe three or more kilometres thick), to expose the granite to the weather and erosion. A considerable thickness of the granite itself has also been removed from above the present land surface. If you scan the country around the base of Mount Norman from Castle Rock, the expanse of bare granite slabs and small monoliths gives some small idea of the truly vast volume of molten magma that was involved in the Stanthorpe Granite intrusion.

Intimate details

In fresh rock surfaces, you can see the four main mineral constituents of granites - clear grains of quartz, pink and white crystals of feldspars, and black flakes of biotite mica, the latter being complex silicates. Larger crystals of the pink feldspar commonly protrude from the surface of the weathered rock. In places narrow veins or dykes of light pink, finer-grained rock called aplite cut the granite. These are the last remnants of molten material which have been squeezed along fractures just before the whole mass finally solidified. Some can be seen on the route up the bare slope of The Pyramid.

Erosion – slow but irresistible

As erosion gradually removes the great weight of rock above the land surface, stresses are released, allowing the granite to expand upwards and crack along fractures (joints), particularly along major 'sheet joints' roughly parallel to the surface. These isolate great sheets of rock of varying thickness. Vertical joints

crack the horizontal sheets, and weathering and decomposition proceed down these, concentrating on the sharp corners and edges of the rock. The process eventually converts the sheets into accumulations of rounded boulders or 'tors'.

The rounding of the boulders is assisted by the process of 'exfoliation', in which thin flakes of the rock slough off from the surface. This phenomenon results from water and air penetrating minute fractures in the rock and initiating chemical decomposition of the minerals, assisted by repeated expansion and contraction of the surface skin from daily heating and cooling. Exfoliation is also a common sight on the surfaces of flat slabs and domes.

At Girraween the granite seems less fractured than elsewhere in the Granite Belt, allowing coherent sections to resist the weathering and erosive forces. The large domes such as The Pyramids, Castle Rock, Mount Norman, Bald Rock and South Bald Rock are not discrete bodies, but simply "small" less-fractured parts of the larger granite mass. This is undergoing erosion at varying rates depending on local fracture patterns. Where fractures are common, the rock is eroded readily to form low valleys with only small boulders.

The ultimate result of weathering is a coarse sandy soil of limited fertility and depth, except along stream courses, and this is a major influence on the vegetation communities we see today.

Giant remnants

On many ridges you can see enormous boulders resting on bare elevated slabs or domes, either together or as isolated individuals. These are the last remnants of sheets of granite once present above major sheet joints, now approximated by the surfaces of the slabs. The extreme examples are balancing rocks, where rounding has also occurred on the under surfaces to leave only a small balancing point. There is a good example on the summit of The Pyramid, where several huge, barely separated, boulders remaining from an upper sheet sit on the surface of the dome, with an isolated remnant forming a balancing rock off to one side. Eventually the boulders become unstable and roll off, or disintegrate into smaller boulders in place. Where one boulder from a higher sheet tips over, it may form an arch across other boulders from a lower sheet, as seen along the Granite Arch circuit. Remnant boulders from a higher sheet can also perch on pinnacles from lower sheets, as is the case at Sphinx Rock.

The scientific part of the granite story is a fascinating glimpse into ancient times, but it hardly captures the beauty of all the myriad shapes and forms of today's scenic terrain. We can still marvel at the infinite variety of nature's handiwork, so enjoy your visit to these cool, clean sensuous outcrops.

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