

LATERITE

Brown laterite gravels, consisting of spherical pellets of iron and aluminium oxides ranging in size commonly from a half to two centimetres in diameter, are commonly found on the tops of hills along the Darling Range and other areas.

Laterite is a residual rock, a "duricrust" produced by weathering of pre-existing rocks by the action of rainwater. At various stages in the past, the climate of Western Australia has been considerably more humid and wetter than at present. One such period was at its peak during the Oligocene (34 to 24 million years ago), when much of the laterite in this part of Western Australia is thought to have formed.

As the warm rainwater soaked constantly through the rocks, it broke down mineral grains forming the rock and dissolved away many of the chemical elements making them up. Some were more easy to remove than others, such as sodium, potassium and calcium, and magnesium and silicon. However, the iron and aluminium tended to remain behind as their hydrated oxides, such as goethite and gibbsite. These minerals can form as layers of fine-grained material around very altered bits of the original rock, producing the round gravel pellets, as well as forming solid masses of oxide, or pellets may be cemented together to produce a kind of conglomerate.

The loose "ball-bearing" gravels are typical of the upper layers of the laterite deposits, while the lower parts are usually more solid. Since the main period of lateritisation there has been constant reworking of some of this material, some areas have been enriched in iron, and much material has been eroded away. One of the current ideas is that many laterite deposits were originally formed in valleys, by material being washed down into them and building up on the bottom. This layer of resistant iron-rich rock then protected the valley floor from being eroded over time, whereas the hilltops on either side were not protected and could be worn away. This has resulted in a reversal of relief, with the areas which were low ground becoming hills, and the original high ground turning into valleys.

Very severe lateritisation results in the removal of iron oxides as well, leaving behind the hydrated aluminium oxide ore known as "bauxite". Bauxite deposits are found in various parts of the Darling Range and some are important ore deposits.

Laterites and other duricrusts are found extensively over other parts of WA. Typical of outback scenery are "breakaways", small flat-topped hills and ridges with duricrust cappings protecting the soft rocks below. Kimberley laterites and bauxites (like those of the Mitchell Plateau) are believed to be older than those of the south, and to have been formed between 70 to 50 million years ago, when the area was in tropical latitudes and had high rainfall.