

FOSSILS HELP TO SOLVE A GEOLOGICAL PROBLEM

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The rocks of the Karoo sequence cover the major portion of South Africa. The oldest rocks of this sequence are those of the Dwyka Formation which were deposited by glaciers during an ice age about 300 million years ago, while the youngest, the Clarens Formation, were deposited in a desert environment about 290 million years ago.

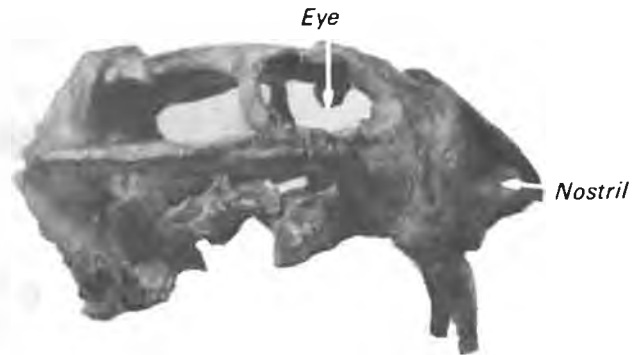
Economically and strategically, however, the most important rocks of the Karoo Sequence are those of the Ecca Group as all the coal which is mined in the Free State, Transvaal and Natal comes from these rocks. The Ecca rocks were deposited in a delta environment as large rivers met the central Karoo sea, and as there was plenty of water in this environment, there was an abundance of plant growth which eventually led to the formation of coal beds.



Side view of large Dinocephalian skull (scale = 1 cm). This was a plant-eating animal which was one of the largest animals which lived in South Africa during Beaufort times.

Immediately on top of the rocks of the Ecca Group, are the rocks of the Beaufort Group, which, as you can see from the map, cover most of South Africa. Although these rocks have not yet produced economic minerals in great quantities, they are world-renowned for their wealth of fossil reptiles.

A problem that has puzzled geologists for numerous years, is the exact position of the boundary between the Ecca and Beaufort Groups, and much research has been done to try and solve this problem.



Side view of skull of EODICYNODON.

Research on fossils undertaken at the National Museum, revealed a most interesting pattern in the fossil content of the rocks of the contact zone between the Ecca and Beaufort Groups in the southern Karoo. Above a certain horizon, fossils of reptiles as well as well-preserved and complete plant fossils are found. However, below this horizon, no reptiles but only fossils of finely ground up plant fragments have been found. This appears to indicate that the broken up plants were transported, while the complete ones were preserved close to the position where they used to grow.

Closer research on the rocks themselves has revealed that at this horizon the character of the rocks changes too. In fact those below the line have characteristics which indicate that they were deposited as sediments in a shallow "sea," while those above the horizon, were deposited on land.

This line, on the map alongside, represents the shoreline of the ancient Karoo "sea" in a portion of the southern Karoo. It also illustrates as a very good divider between the rocks of the Ecca and Beaufort Groups, and may result in the Ecca-Beaufort contact in the southern Karoo being moved downwards.

The above is an illustration of how geological problems can be solved through using fossils.



GEOLOGICAL MAP OF THE KAROO SEQUENCE

