
An Australian perspective on the early evolution of Animals

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South Lecture Theatre 1



The oldest macroorganisms known in Earth, after almost 3.5 billion years of microscopic evolution, are the Ediacara Biota (~575 million years ago =Ma), named after the Ediacaran Hills in the Flinders Ranges (South Australia) but also found in Canada, Russia, China and Namibia. Most of these organisms show no mineralization and they reveal very diverse morphologies. However, their phylogenetic relationships, even their assignment to the Animal Kingdom, is still highly controversial.



Shortly afterwards, in geological terms, came the Cambrian ‘explosion’, the event that gave rise to most phyla –highest-rank groups within animals– some 540 Ma. Most fossil localities only preserve shells, exoskeletons or bones, but some exceptional outcrops, known as Konservat-Lagerstätten, preserve soft-bodied organisms, and even their internal organs (digestive tube, blood vessels, nervous system) and other delicate structures (such as eyes or gills). The first –and best studied– such locality described for this period is the Burgess Shale in Canada, but others have been located in China, Greenland and Australia. The only Cambrian Lagerstätte so far known in the Southern Hemisphere is the Emu Bay Shale (515 Ma) in Kangaroo Island (South Australia), and it contains fossils of more than 50 species of those early sponges, worms, brachiopods, molluscs, onychophorans and arthropods. There is just one place in the world where these two biotas are represented within just a few hundred kilometres from each other: South Australia.

Ecology and Evolution Research Group Seminar series
