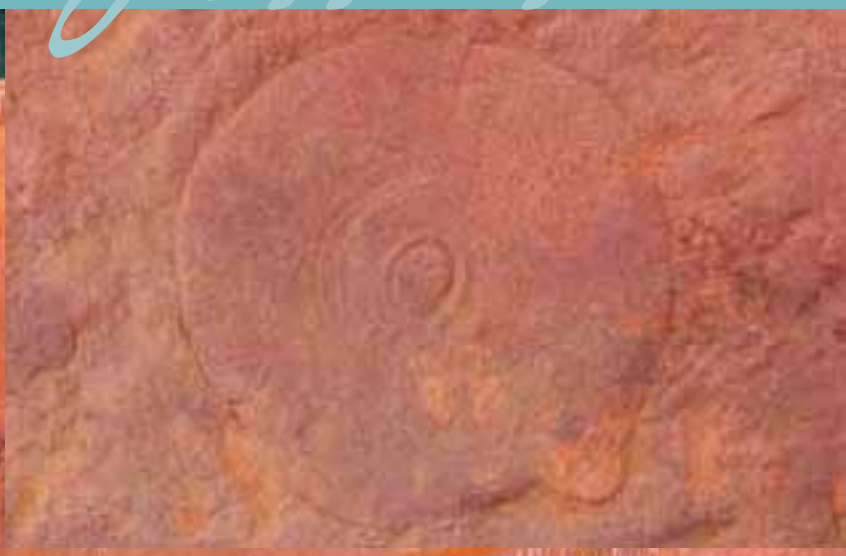
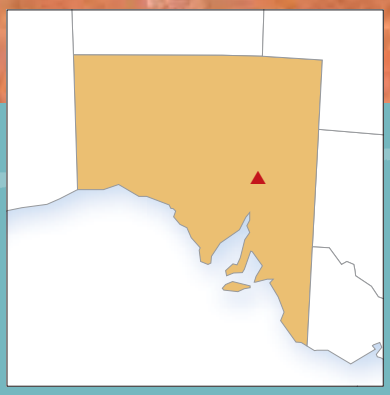
Ediacara Fossils





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Ediacara Fossil Site – Nilpena, South Australia

Today Australia is a hot, dry continent but hundreds of millions of years ago the landscape was very different – most of eastern Australia lay under shallow, warm seas.

Between 570 and 540 million years ago (long before dinosaurs roamed the Earth) these warm seas were inhabited by soft bodied organisms, similar to jellyfish.

Some of these organisms became trapped in fine silt in tidal flats and were fossilised as the silt turned to stone. As sea levels changed, the seafloor become part of what we today know as the Flinders Ranges in South Australia, and the fossils found there formed part of a period known today as the Ediacaran Period. Examples of these unusual and fragile fossils, including *Dickinsonia* and *Spriggina* can be seen at the South Australian Museum.

In 1946, while exploring for minerals, geologist Reginald Sprigg discovered fossil imprints in rocks around the low hills of the western Flinders Ranges at the old Ediacara minefield.

Sprigg's discovery was extremely important as it was the first time the fossilised remains of an entire community of soft bodied creatures had been found in such abundance anywhere in the world. Sprigg's discovery was so significant that fossils were named after him and the Ediacaran Period was named after the location where the fossils were found.

The fossils preserved in the ancient seafloor at Ediacara record the first known multicellular animal life on Earth that predates the Cambrian. This diverse and exquisitely preserved community of ancient organisms represents a significant snapshot of our geological heritage.

Up until their discovery scientists believed that only organisms with hard parts, such as shells or skeletons, could be preserved in the fossil record. This discovery gave scientists a new understanding of the evolution of life on earth, as well as a better understanding of how fossils of organisms with soft tissue can become preserved in the fossil record.

Some scientists believe many of the organisms found at Ediacara may represent early algae, lichens or even multicellular 'experiments', which bear little resemblance to organisms existing anywhere in the world today. There are many questions that surrounding these ancient organisms; how they lived, how they evolved and what creatures alive today are their descendents.

The fossils of this period resemble the flatworms, soft corals and jellyfish we know today and range in size from a few centimetres up to a metre long. This diverse array of fossil specimens includes anemones, annelid worms, crustaceans, echinoderms and possible ancestors of trilobites. Other forms resemble modern sea-pens and worms.

Impressions of the largest early known animals, *Dickinsonia rex*, have also been recorded at Ediacara, as well as fossils of what may be the earliest known ancestor of animals with backbones (vertebrates). *Dickinsonia* is interpreted as a worm-like creature, and fossils of these organisms consist of a flat impression, circular to ribbon-shaped with fine segmentation.

The Ediacaran Period is the first geological period to be declared in 120 years and the first to be named after a location in the Southern Hemisphere. Covering an interval of around 88 million years from 630 to 542 million years ago, the start of the Ediacaran Period corresponds to the end of a world wide glaciation known as 'Snowball Earth' as well as significant changes in carbon levels.

The rapid increase in abundance, size, complexity and diversity of life forms during this time shows that the earth underwent a period of major evolutionary change. Around 30 other Ediacara localities are now known globally including sites in Namibia, Russia, Newfoundland, Canada, UK and Siberia. Some of the greatest examples of this ancient biodiversity are found in Australia and Russia.